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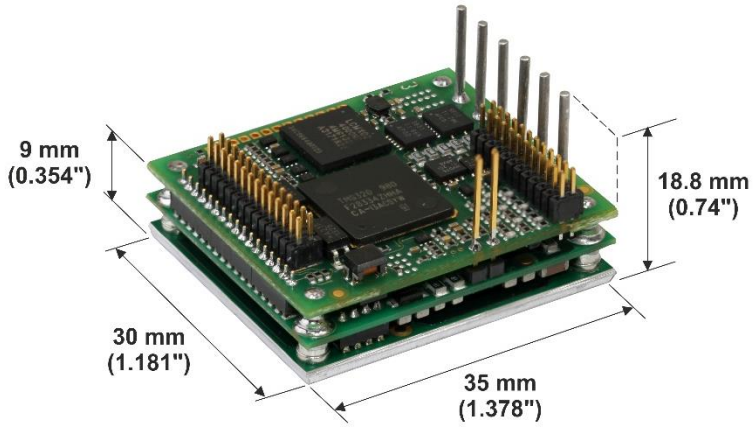
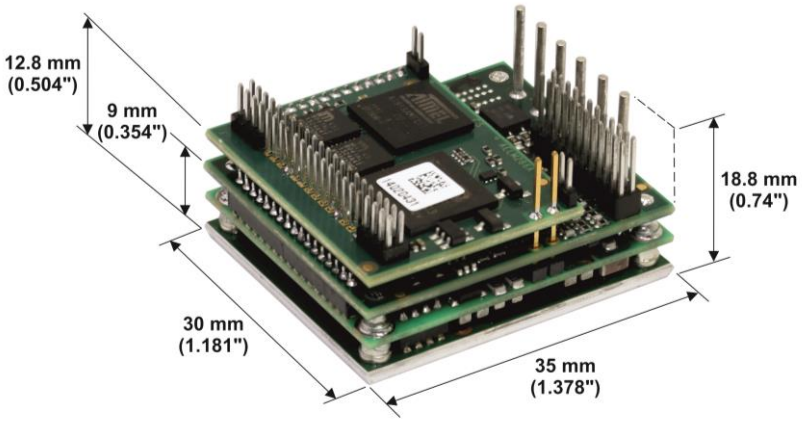
Gold Twitter
Digital Servo Drive
Installation Guide
CAN and EtherCAT





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Elmo Motion Control

Notice

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- This guide contains proprietary information belonging to Elmo Motion Control Ltd. Such information is supplied solely for the purpose of assisting users of the Gold Twitter servo drive in its installation.
- The text and graphics included in this manual are for the purpose of illustration and reference only. The specifications on which they are based are subject to change without notice.
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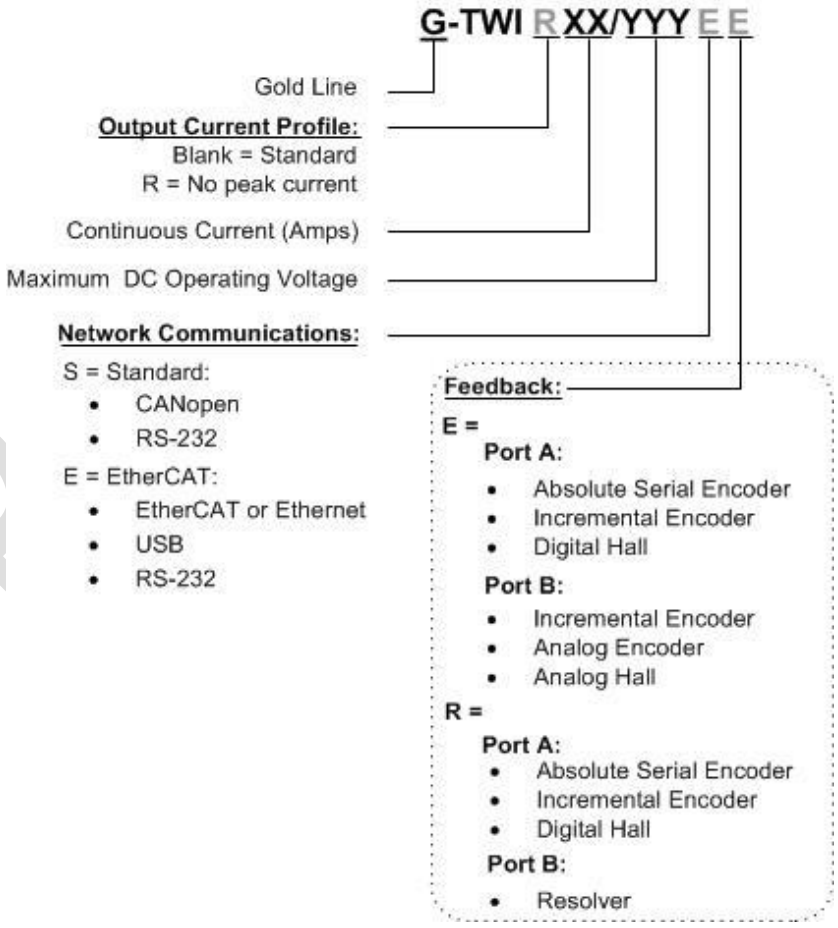
Document no. MAN-G-TWI (Ver. 1.005)

Catalog Number



Revision History

Version	Date	Details
Ver. 1.004	Oct 2014	Initial document
Ver. 1.005	Nov 2014	Changes to RS232 signal names in section 8.3.6.

Chapter 1: This Installation Guide

This installation Guide details the technical data, pinouts, and power connectivity of the Gold Twitter. For a comprehensive detailed description of the functions and connections of the drive, refer to the Gold Board Level Module Hardware Manual.

Chapter 2: Safety Information

In order to achieve the optimum, safe operation of the Gold Twitter, it is imperative that you implement the safety procedures included in this installation guide. This information is provided to protect you and to keep your work area safe when operating the Gold Twitter and accompanying equipment.

Please read this chapter carefully before you begin the installation process.

Before you start, ensure that all system components are connected to earth ground. Electrical safety is provided through a low-resistance earth connection.

Only qualified personnel may install, adjust, maintain and repair the servo drive. A qualified person has the knowledge and authorization to perform tasks such as transporting, assembling, installing, commissioning and operating motors.

The Gold Twitter contains electrostatic-sensitive components that can be damaged if handled incorrectly. To prevent any electrostatic damage, avoid contact with highly insulating materials, such as plastic film and synthetic fabrics. Place the product on a conductive surface and ground yourself in order to discharge any possible static electricity build-up.

To avoid any potential hazards that may cause severe personal injury or damage to the product during operation, keep all covers and cabinet doors shut.

The following safety symbols are used in this and all Elmo Motion Control manuals:

Warning:
This information is needed to avoid a safety hazard, which might cause bodily injury or death as a result of incorrect operation.

Caution:
This information is necessary to prevent bodily injury, damage to the product or to other equipment.

Important:
Identifies information that is critical for successful application and understanding of the product.

2.1. Warnings

- To avoid electric arcing and hazards to personnel and electrical contacts, never connect/disconnect the servo drive while the power source is on.
- Power cables can carry a high voltage, even when the motor is not in motion. Disconnect the Gold Twitter from all voltage sources before servicing.
- The high voltage products within the Gold Line range contain grounding conduits for electric current protection. Any disruption to these conduits may cause the instrument to become hot (live) and dangerous.
- After shutting off the power and removing the power source from your equipment, wait at least 1 minute before touching or disconnecting parts of the equipment that are normally loaded with electrical charges (such as capacitors or contacts). Measuring the electrical contact points with a meter, before touching the equipment, is recommended.

2.2. Cautions

- The maximum DC power supply connected to the instrument must comply with the parameters outlined in this guide.
- When connecting the Gold Twitter to an approved isolated from the Mains auxiliary power supply, connect it through a line that is separated from hazardous live voltages using reinforced or double insulation in accordance with approved safety standards.
- Before switching on the Gold Twitter, verify that all safety precautions have been observed and that the installation procedures in this manual have been followed.
- Make sure that the Safe Torque Off is operational

2.3. CE Marking Conformance

The Gold Twitter is intended for incorporation in a machine or end product. The actual end product must comply with all safety aspects of the relevant requirements of the European Safety of Machinery Directive 2006/42/EC as amended, and with those of the most recent versions of standards EN 60204-1 and EN ISO 12100 at the least, and in accordance with 2006/95/EC.

Concerning electrical equipment designed for use within certain voltage limits, the Gold Twitter meets the provisions outlined in 2006/95/EC. The party responsible for ensuring that the equipment meets the limits required by EMC regulations is the manufacturer of the end product.

2.4. Warranty Information

The products covered in this manual are warranted to be free of defects in material and workmanship and conform to the specifications stated either within this document or in the product catalog description. All Elmo drives are warranted for a period of 12 months from the time of installation, or 18 months from time of shipment, whichever comes first. No other warranties, expressed or implied — and including a warranty of merchantability and fitness for a particular purpose — extend beyond this warranty.

Chapter 3: Product Description

The Gold Twitter is an advanced high power density servo drive, delivering up to **4 kW power** in a 12.6 cc (0.769 in³) compact package (35 x 30 x 12 mm or 1.38" x 1.18" x 0.47"). The Gold Twitter is designed to be mounted on a PCB by soldering its pins directly to the PCB.

This advanced, high power density servo drive provides top performance, advanced networking and built-in safety, as well as a fully featured motion controller and local intelligence. The Gold Twitter operates from a DC power source from 8V up to 195V. It does not require an additional power supply if the DC power supply is between 12V to 40V, otherwise an isolated from the Mains DC power source (12 to 40V) for logic, is required.

The drive can operate as a stand-alone device or as part of a multi-axis system in a distributed configuration on a real-time network.

The Gold Twitter drive is easily set up and tuned using the Elmo Application Studio (EASII) software tools. As part of the Gold product line, it is fully programmable with the Elmo motion control language. For more information about software tools refer to the Elmo Application Studio Software Manual.

The Gold Twitter is available in a variety of models. There are multiple power rating options, different communications options, a number of feedback options and different I/O configuration possibilities.

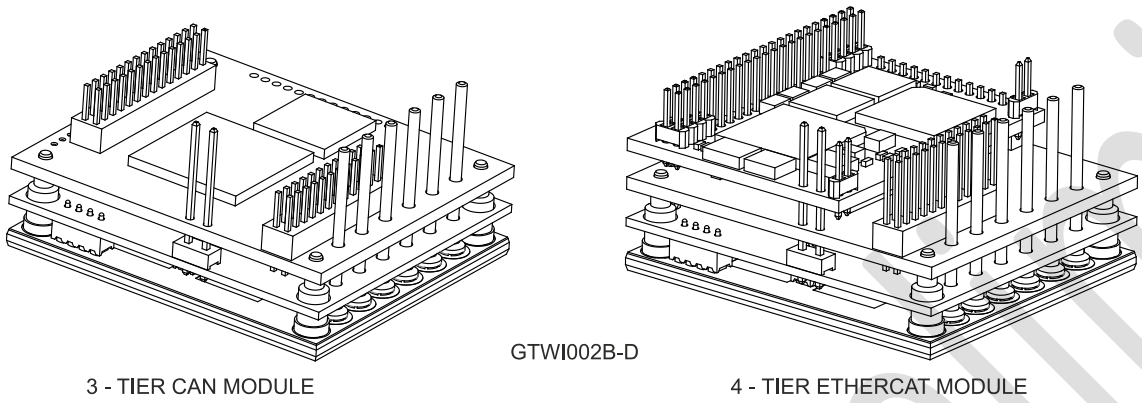


Figure 1: Difference between 3-Tier CAN and 4-Tier EtherCAT modules

Within the variety of models offered, the CAN and EtherCAT versions are physically different in that the CAN version has three tiers, whereas the EtherCAT version has four tiers, as shown in Figure 1.

Chapter 4: Technical Information

4.1. Physical Specifications

Feature	Units	All Types
Weight	g (oz)	EtherCAT Version: 22.2 g (0.78 oz) CAN Version: 18.6 g (0.66 oz)
EtherCAT Version Dimension	mm (in)	35 x 30 x 18.8 mm (1.38" x 1.18" x 0. 0.74")
CAN Version Dimension	mm (in)	35 x 30 x 18.8 mm (1.38" x 1.18" x 0. 0.74")
Mounting method		PCB mount

4.2. Technical Data

Feature	Units	30/60	3/100	6/100	10/100	15/100	25/100	10/200
Minimum supply voltage	VDC	8	10	10	10	10	10	20
Nominal supply voltage	VDC	48	85	85	85	85	85	170
Maximum supply voltage	VDC	55	95	95	95	95	95	195
Maximum peak / continuous electrical power output	kW	2.6 / 1.3	0.6 / 0.3	0.5 / 1.0	1.6 / 0.8	2.4 / 1.2	4.0 / 2.0	3.2 / 1.6
Efficiency at rated power (at nominal conditions)	%	> 99						
Maximum output voltage		>95% of DC bus voltage at Ts = 50 us						
Ic, Amplitude sinusoidal/DC continuous current	A	30	3	6	10	15	25	10
Sinusoidal continuous RMS current limit (Ic)	A	21	2.1		7.1	10	17.6	7.12
Peak current limit	A	2 x Ic for 3 seconds						

Table 1: Technical Data

4.2.1. R Type

Feature	Units	R50/60	R45/100	R15/200
Minimum supply voltage	VDC	8	10	20
Nominal supply voltage	VDC	48	85	170
Maximum supply voltage	VDC	55	95	195
Maximum continuous Electrical power output	kW	2.2	3.6	2.4
Efficiency at rated power (at nominal conditions)	%	> 99		
Maximum output voltage		>95% of DC bus voltage at Ts = 50 us		
Amplitude sinusoidal/DC continuous current	A	50	45	15
Sinusoidal continuous RMS current limit (Ic)	A	35.5	32	10.6
Current limit	A	Max Output current is guaranteed for $T_{Heat\text{-}Sink}$ <85°C		

4.2.2. Auxiliary Supply Input Voltage (VL)

Feature	Unit	Details
Standard CAN (S option)		
Input range	V	12V – 40
Power consumption (including 5 V/200 mA for encoder)	W	<2.5W
ETHERCAT (E option)		
Input range	V	14V – 40
Power consumption (including 5 V/200 mA for encoder)	W	<4W

4.2.3. Product Features

Main Feature	Details	Presence / No.
STO	5V Logic Level, Opto isolated from the Control section	**√**
Digital Input Option	5V Logic Level (Internally connected to COMRET)	**6**
Digital Output Option	5V logic (Internally connected to COMRET)	**2**
	3.3V logic (Internally connected to COMRET)	**2**
Analog Input	Differential ±10V	**1**
	Single Ended	**1**
Feedback	Standard Port A, B, & C	**√**
Communication Option	USB	**√**
	EtherCAT	**√**
	CAN	**√**
	RS232 TTL level	**√**
	Standard RS232	**√**

Chapter 5: Unpacking the Drive Components

Before you begin working with the Gold Twitter, verify that you have all of its components, as follows:

- The Gold Twitter servo drive
- The Elmo Application Studio (EASII) software and software manual

The Gold Twitter is shipped in a cardboard box with Styrofoam protection.

To unpack the Gold Twitter:

1. Carefully remove the servo drive from the box and the Styrofoam.
2. Check the drive to ensure that there is no visible damage to the instrument. If any damage has occurred, report it immediately to the carrier that delivered your drive.
3. To ensure that the Gold Twitter you have unpacked is the appropriate type for your requirements, locate the part number sticker on the side of the Gold Twitter. It looks like this:

GTWI017A

4. Verify that the Gold Twitter type is the one that you ordered, and ensure that the voltage meets your specific requirements.
   The part number at the top provides the type designation. Refer to the appropriate part number in the section Catalog Number at the beginning of the installation guide.

Chapter 6: Mounting the Gold Twitter

The Gold Twitter was designed for mounting on a printed circuit board (PCB) via 1.27 mm pitch 0.40 mm square pins, 2 mm pitch 0.51 mm square pins and 3.65 mm pitch 1.20 mm round pins. When integrating the Gold Twitter into a device, be sure to leave about 1 cm (0.4") outward from the heat-sink to enable free air convection around the drive. We recommend that the Gold Twitter be soldered directly to the board. If the PCB is enclosed in a metal chassis, we recommend that the Gold Twitter be screw-mounted to it as well to help with heat dissipation. The Gold Twitter has screw-mount holes on each corner of the heat-sink for this purpose – see below

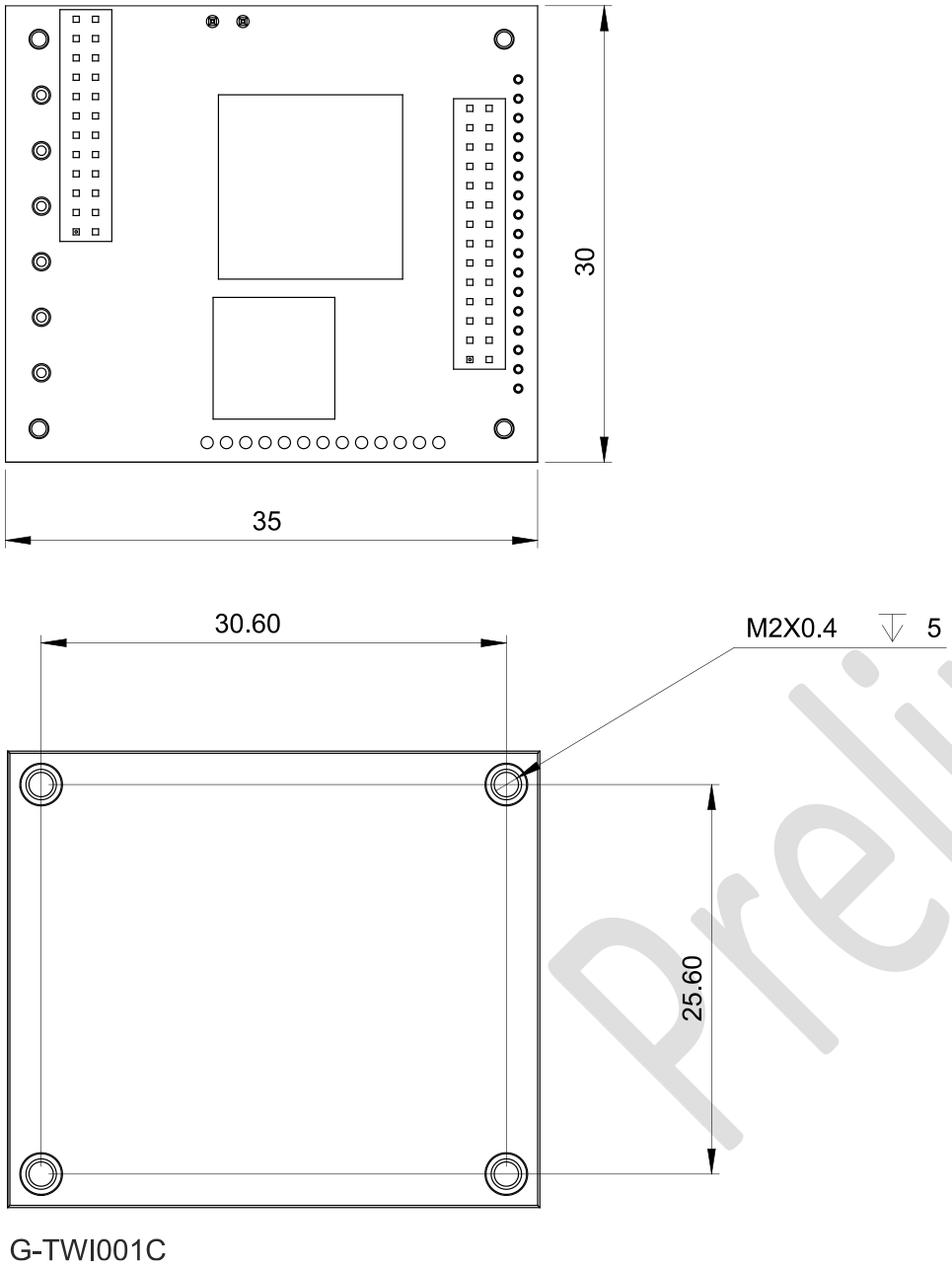


Figure 2: Gold Twitter CAN Version Dimensions

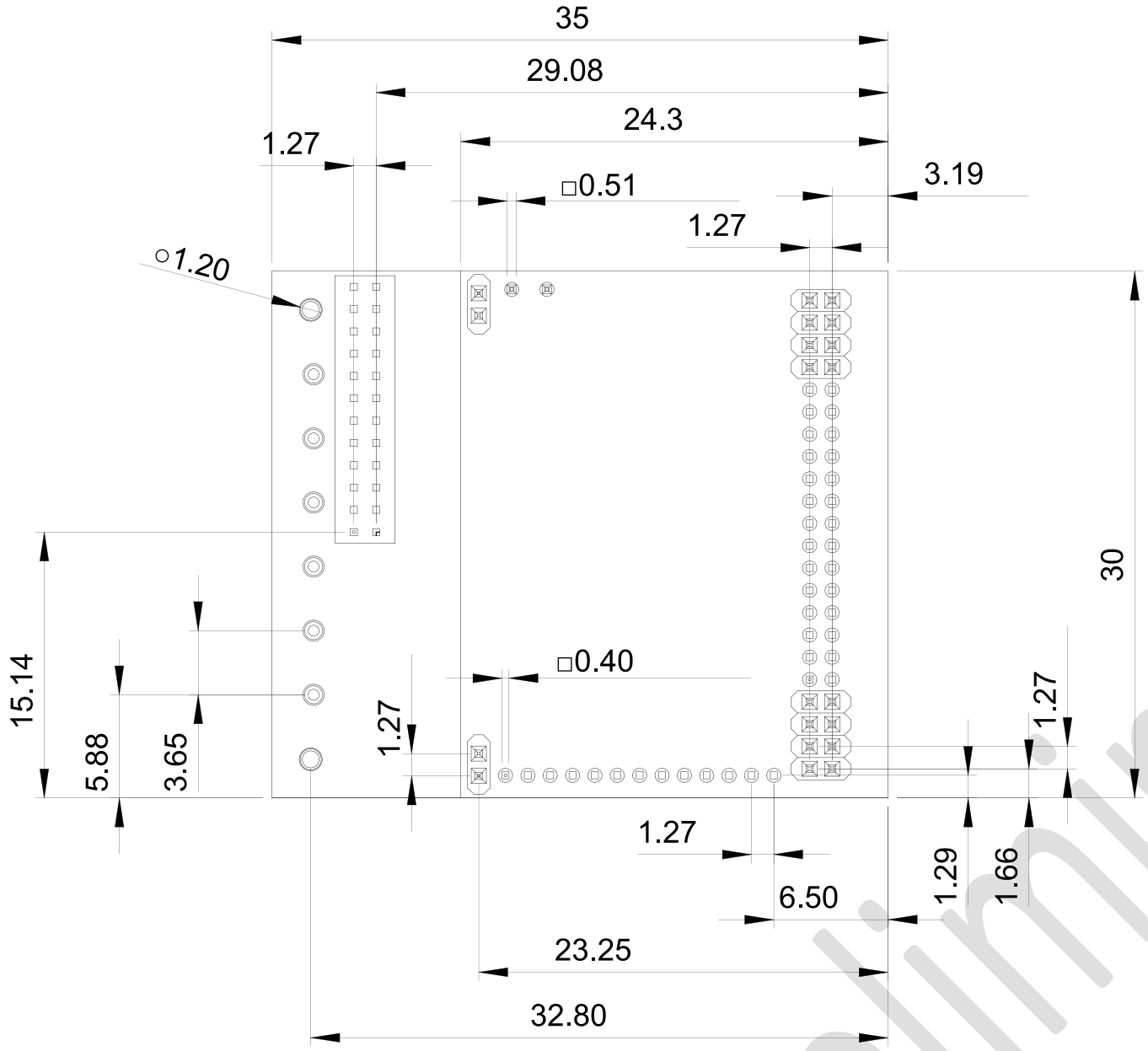


Figure 3: Gold Twitter EtherCAT Version Dimensions

6.1. Integrating the Gold TWE on a PCB

The Gold Twitter is designed to be mounted on a PCB by soldering its pins directly to the PCB.

6.2. The Gold Twitter Connection Diagram

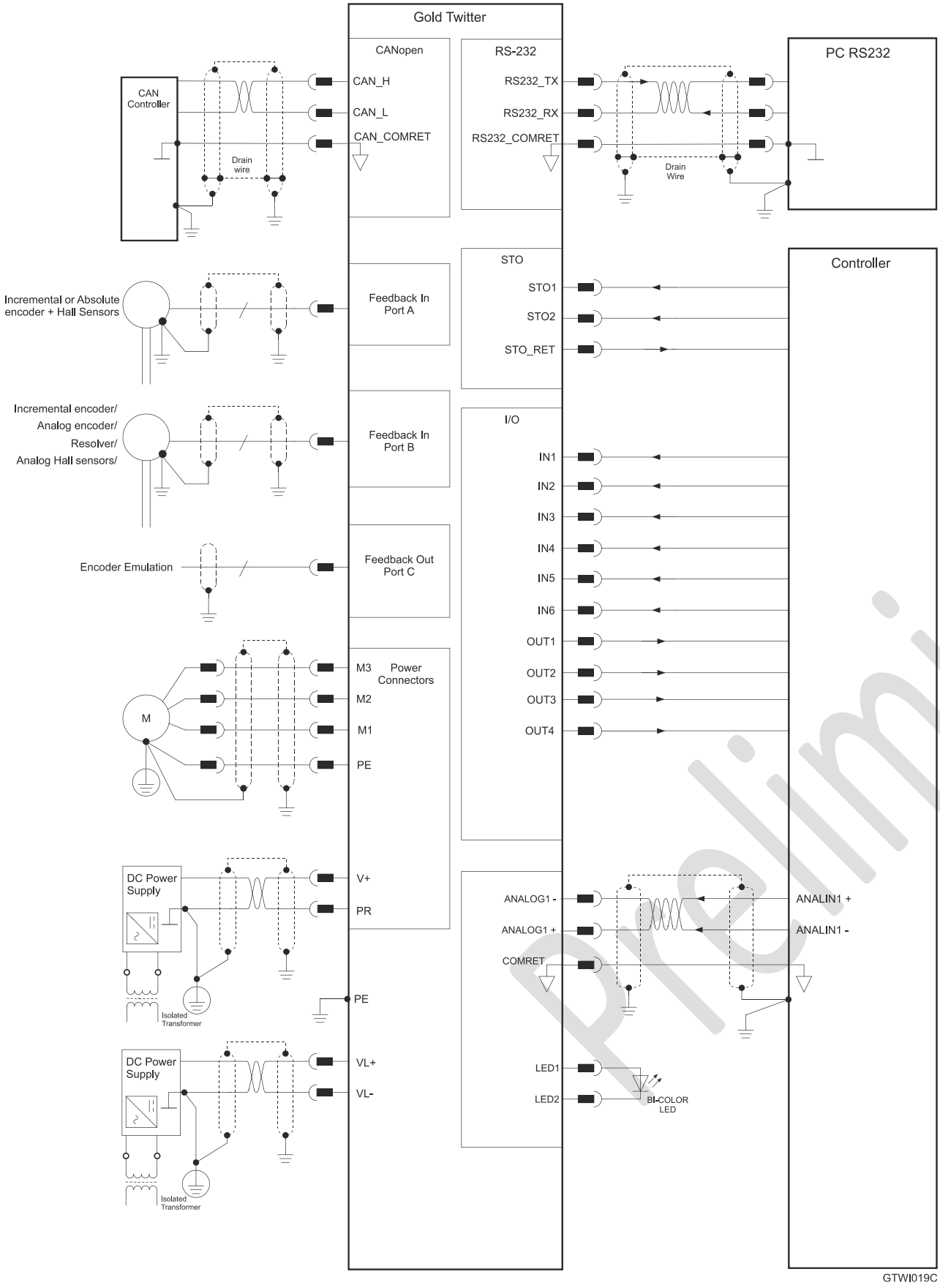


Figure 4: The Gold Twitter CAN Connection Diagram

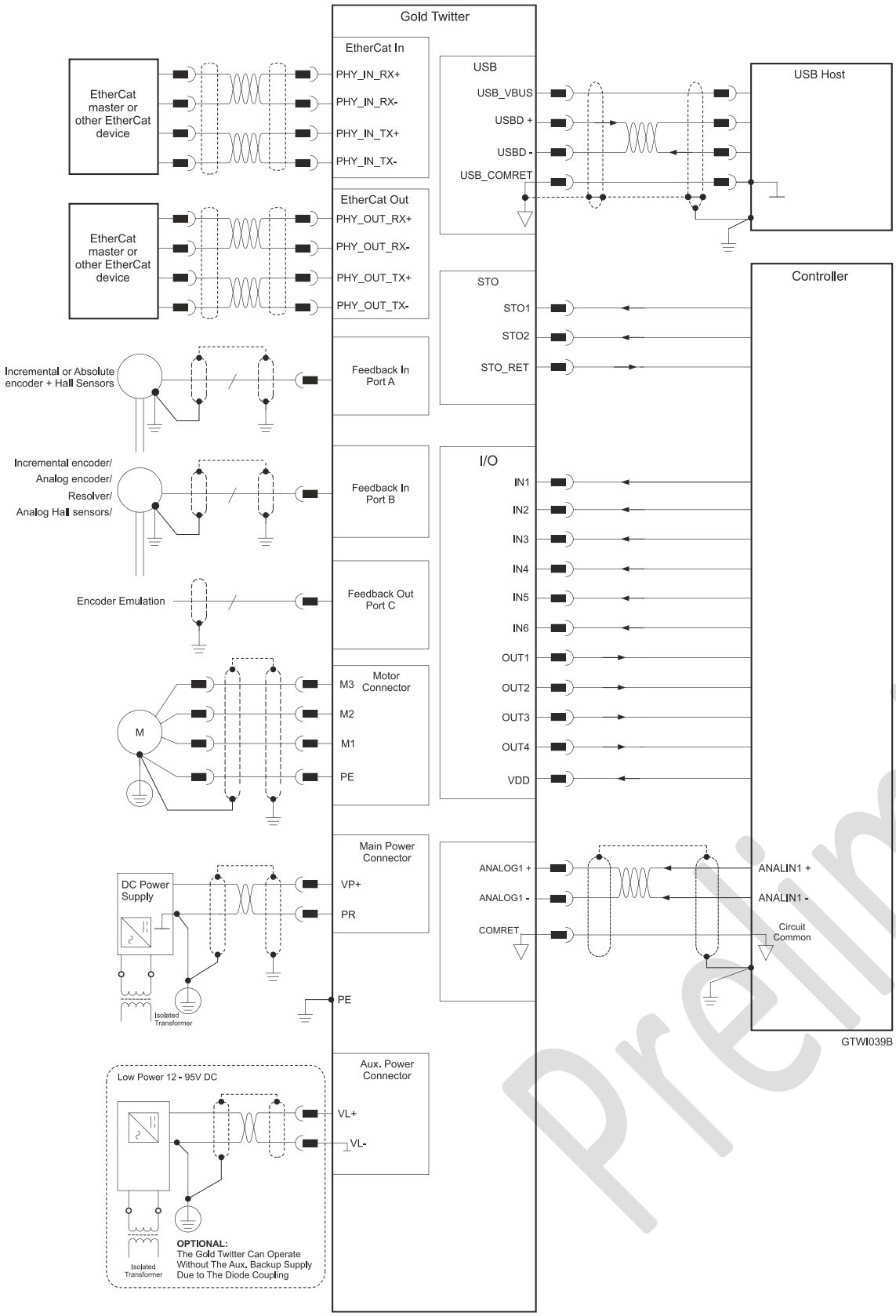
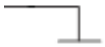
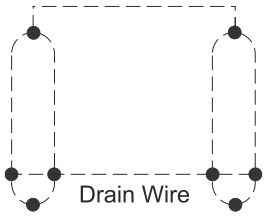
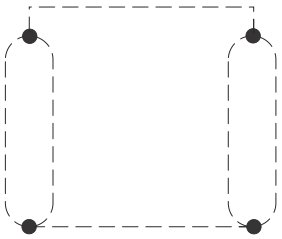
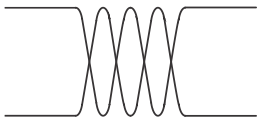


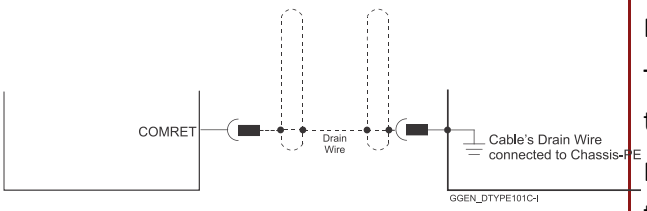
Figure 5: The Gold Twitter EtherCAT Connection Diagram

Chapter 7: Wiring

7.1. Wiring Legend

The following table legend describes the wiring symbols detailed in all installation guides. All the wiring diagrams show wiring for D-TYPE connectors.

Wiring Symbol	Description
	Earth connection (PE)
	Protective Earth Connection
	Common at the Controller
 GGEN_DTYPE101A-A	Shielded cable with drain wire. The drain wire is a non-insulated wire that is in direct contact with the braid (shielding). Shielded cable with drain wire significantly simplifies the wiring and earthing.
 GGEN_DTYPE101A-B	Shielded cable braid only, without drain wire.
 GGEN_DTYPE101A-E	Twisted-pair wires

Wiring Symbol	Description
	Encoder Earthing. The cable`s shield is connected to the chassis (PE) in the connector. Earthing the Encoder and connecting the Earth (PE) to the drive COMRET is mandatory to insure reliable operation, high noise immunity and rejection of voltage common mode interferences.

Chapter 8: Connections

The Gold Twitter has nine connectors.

Port	Pins	Type	Function
FDB	2x12	1.27 mm pitch 0.40 mm sq.	Feedbacks, Digital Halls, Analog Inputs, Communications
M3	1x1	3.65 mm pitch 1.20 mm round pins	Motor power output 3
M2	1x1		Motor power output 2
M1	1x1		Motor power output 1
PE	1x1		Protective earth
PR	1x1		Power output return
VP+	1x1		DC Positive power input
VL+	1x2	2 mm pitch 0.51 mm sq.	VL+
VL-			VL-
MAIN	2x14	1.27 mm pitch 0.40 mm sq.	I/O, LEDs, STO, CAN or EtherCAT
ECT1	2x4	1.27 mm pitch 0.40 mm sq.	Available only for EtherCAT Version
ECT2	2x4	1.27 mm pitch 0.40 mm sq.	Available only for EtherCAT Version
ECT3	2x4	1.27 mm pitch 0.40 mm sq.	Available only for EtherCAT Version
3.3 V	1x2	1.27 mm pitch 0.40 mm sq.	Available only for EtherCAT Version Only for LEDS end Transformer

Connectors Location

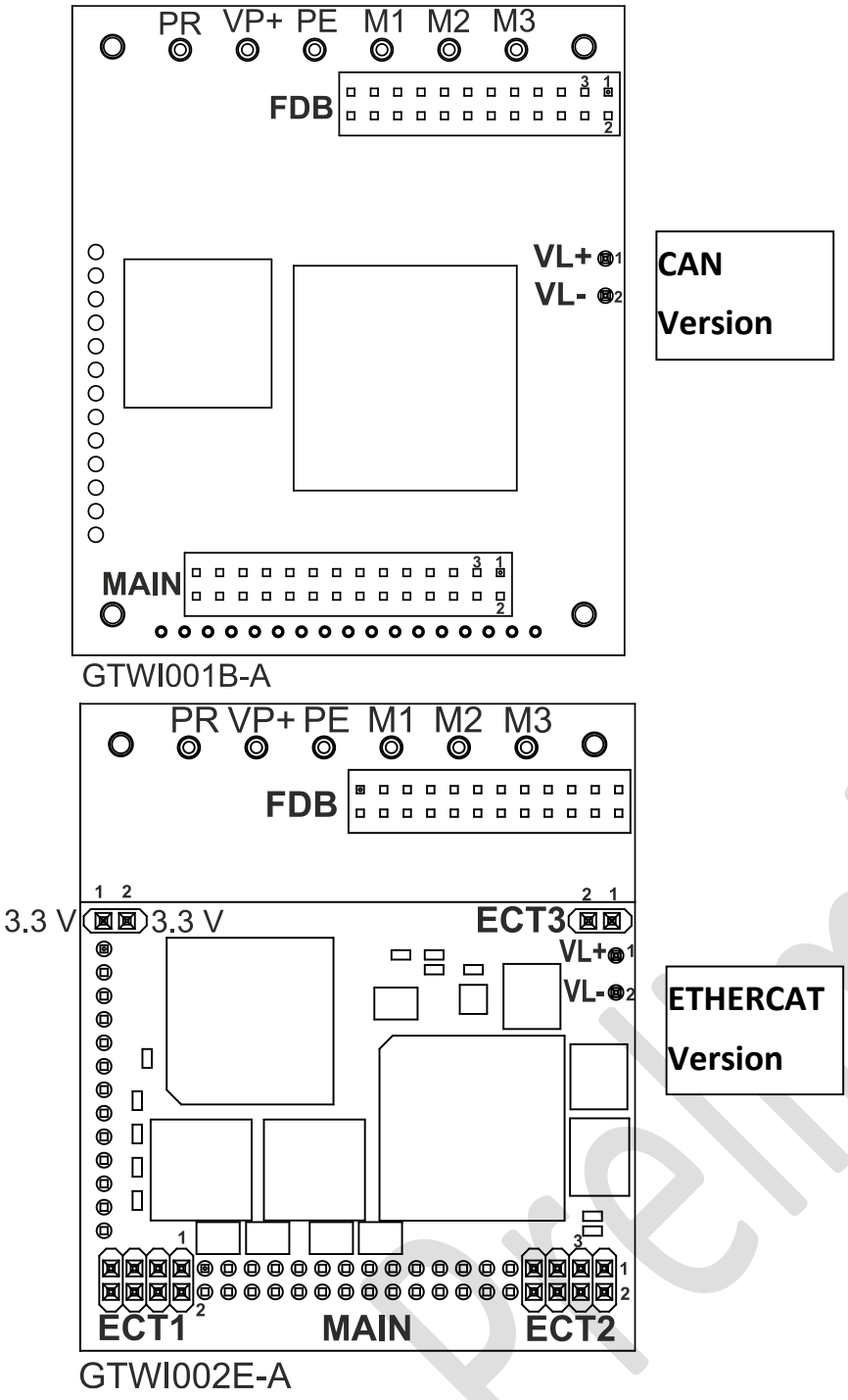


Table 2: Connector Types

8.1. Main Power, Auxiliary Power, Motor Power

This section describes the Main, Auxiliary, and Motor Power.

8.1.1. Motor Power

For full details see Section 7.3 in the manual: MAN-G-Board Level Modules Hardware manual.

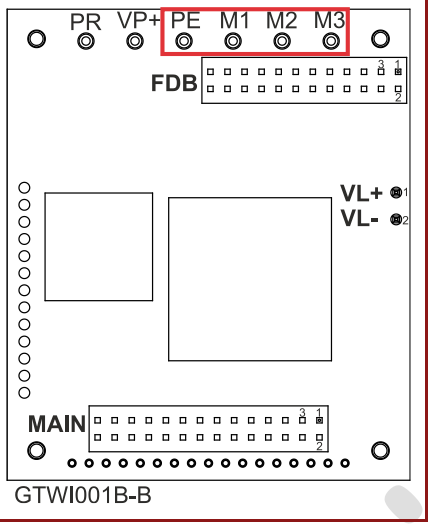
Pin	Function	Cable		Pin Positions
		Brushless Motor	Brushed DC Motor	
PE	Connection earth	Motor	Motor	
M1	Motor phase	Motor	N/C	
M2	Motor phase	Motor	Motor	
M3	Motor phase	Motor	Motor	

Table 3: Motor Connector

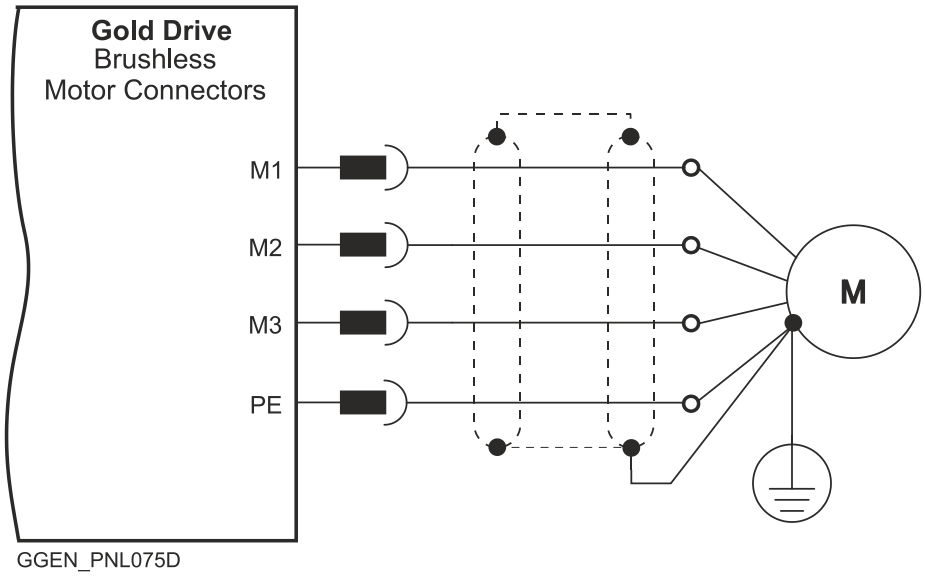


Figure 6: Brushless Motor Power Connection Diagram

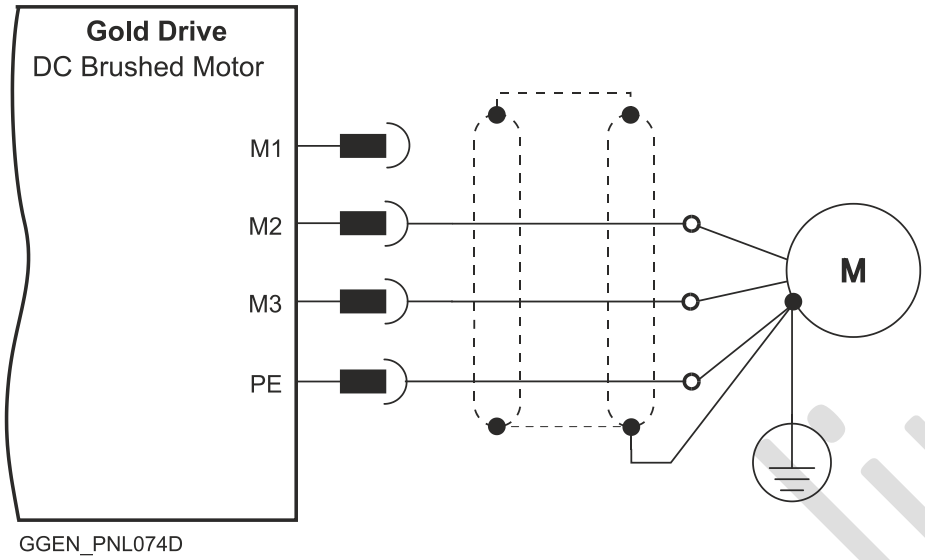


Figure 7: Brushed Motor Power Connection Diagram

8.1.2. Main Power and Auxiliary Power Connector

This section describes the Main and Auxiliary Power.

8.1.2.1. Main Power

The VDC isolated from the Mains DC power source is not included with the Gold Twitter.

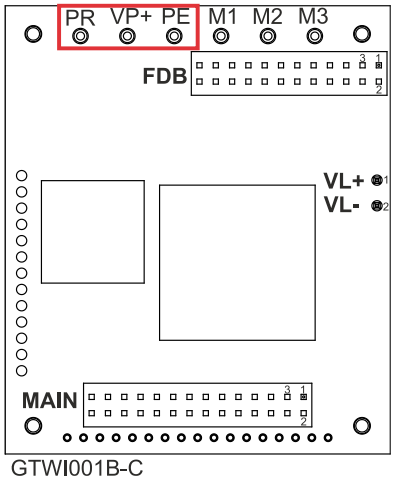
Pin	Function	Cable	Pin Positions
VP+	DC Pos. Power input	Power	
PR	Power output return	Power	
PE	Protective earth	Power	

Table 4: Connector for Main Power

Connect the DC power cable to the VP+ and PR terminals on the Main Power Connector.

To connect your integration board to the DC power supply:

1. The source of the VDC power supply must be isolated from the Mains.
2. For best immunity, it is highly recommended to use twisted and shielded cables for the DC power supply. A 3-wire shielded cable should be used. The gauge is determined by the actual current consumption of the motor.
3. Connect the cable shield to the closest earth connection near the power supply.
4. Connect the PE to the closest earth connection near the power supply.
5. Connect the PR to the closest earth connection near the power supply.
6. Before applying power, first verify the polarity of the connection.

8.1.2.2. Auxiliary Supply

Connect the VL+ and VL- pins on the Gold Twitter in the manner described in the table and drawing below.

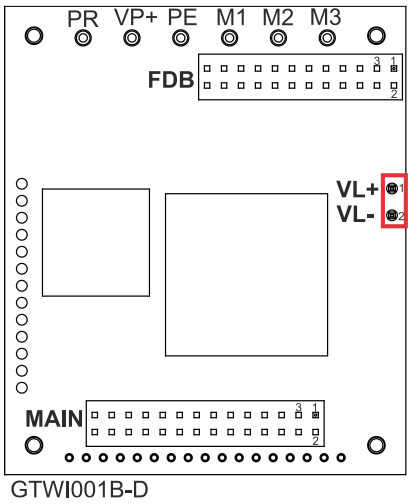
Pin	Signal	Function	Pin Positions
1	VL+	Auxiliary Supply Input	
2	VL-	Auxiliary Supply Return	
1. Standard CAN (S option) Input range: 12VDC – 40VDC Power consumption: <2.5W (including 5 V/200 mA for encoder) 2. EtherCAT (E option) Input range: 14VDC – 40VDC Power consumption: <4W (including 5 V/200 mA for encoder)			

Table 5: Auxiliary Supply Pins

*Connect the VL+ and VL- terminal to the **Auxiliary** Connector.*

To connect your integration board to the auxiliary supply:

1. The source of the Auxiliary Supply must be isolated from the Mains.
2. For safety reasons, connect the return (common) of the auxiliary supply source to the closest earth connection near the auxiliary supply source
3. Connect the cable shield to the closest earth connection near the auxiliary supply source
4. Before applying power, first verify the polarity of the connection.

8.1.2.3. Dual Power Supply

The following figure describes the connection of Main Power and auxiliary. Two power isolated from the mains DC power sources are required, main power according to specification and auxiliary for logic.

Note: **The PR and the VL- are connected internally in the Gold Twitter.**

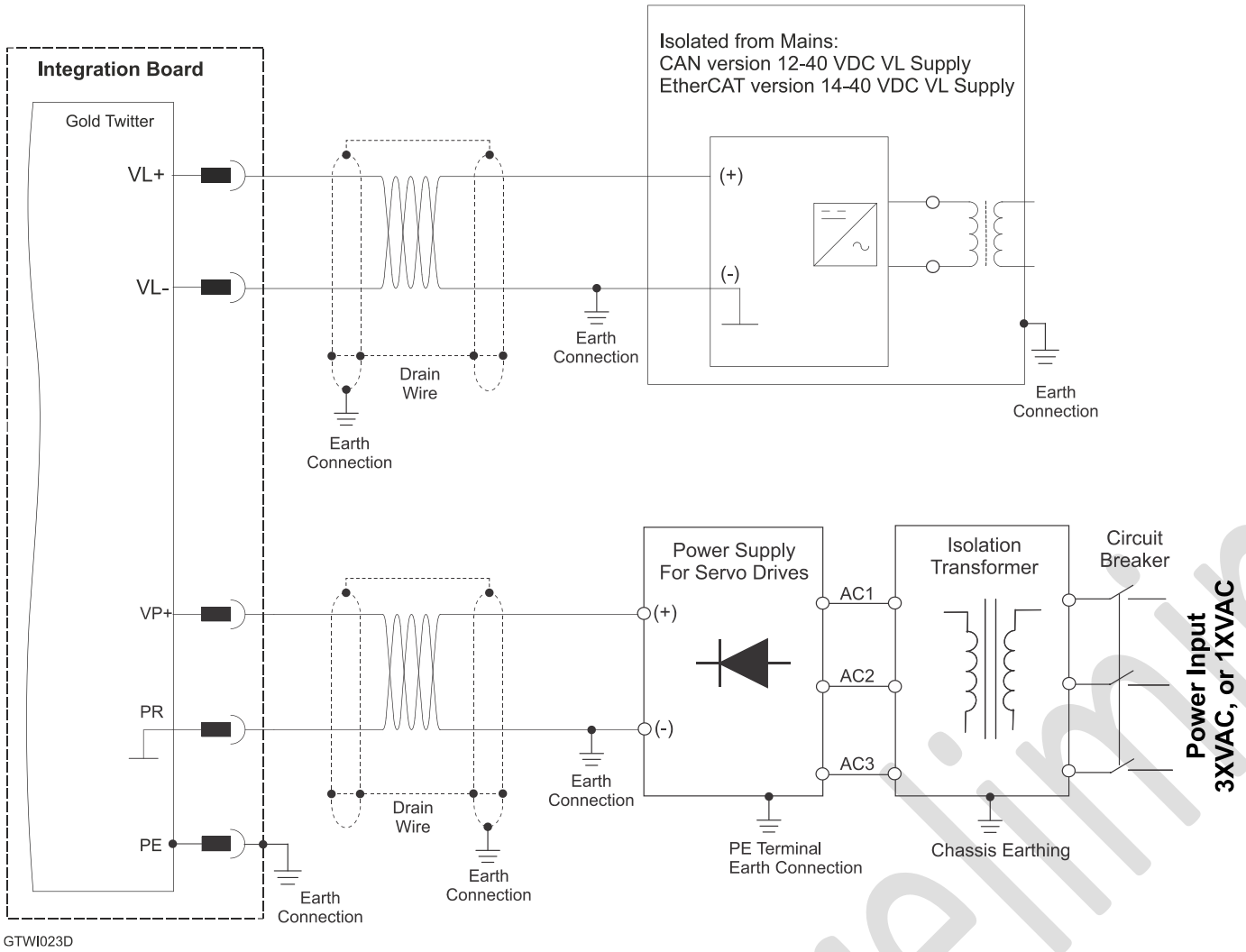


Figure 8: Separate VP and VL Power Supply Connection Diagram

8.1.2.4. Single Power supply (12VDC to 40VDC)

Note: For the EtherCAT (E option), the minimum VL is 14 VDC.

For the CAN version power rating of 12VDC to 40VDC, or 14VDC to 40VDC for the EtherCAT version, a single Power Supply can be used, without the necessity for an auxiliary power supply for the logic.

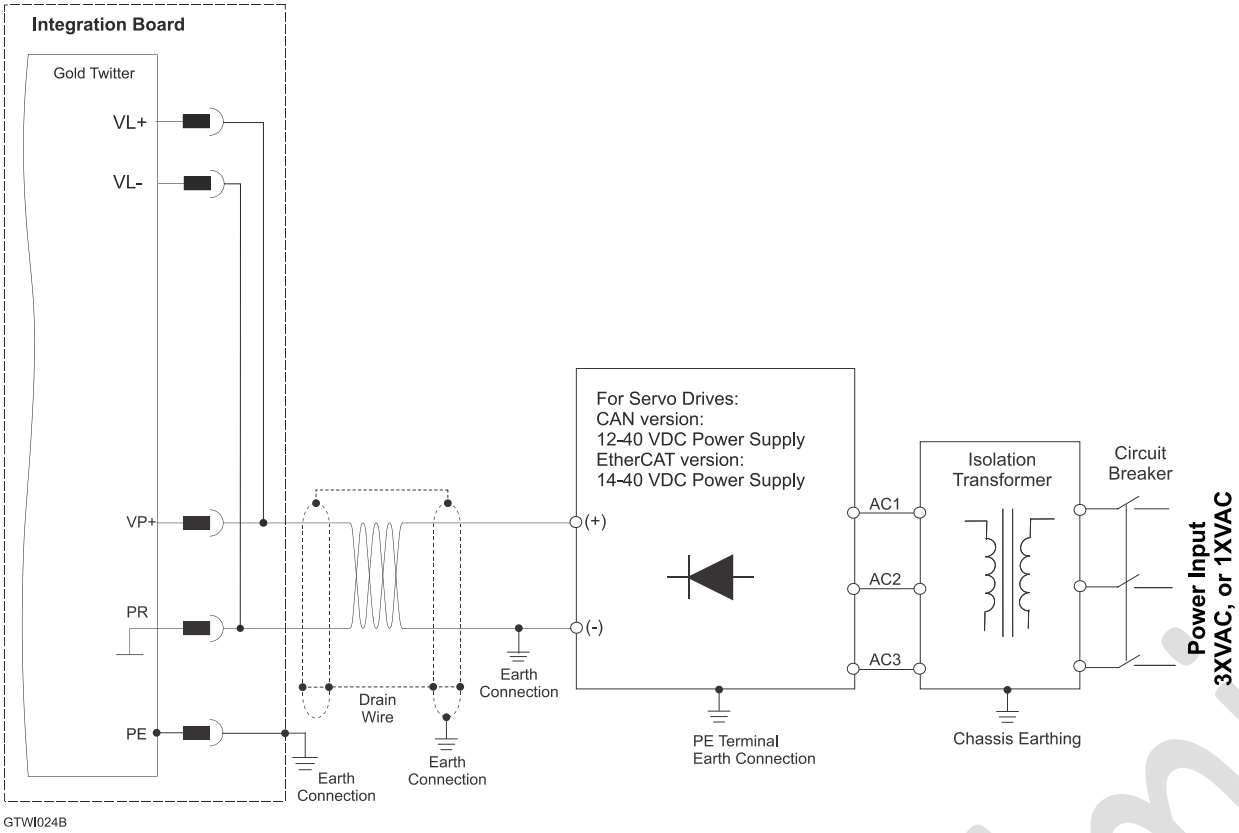


Figure 9: Single Power Supply (<40V) Connection Diagram With VL+ connected internally

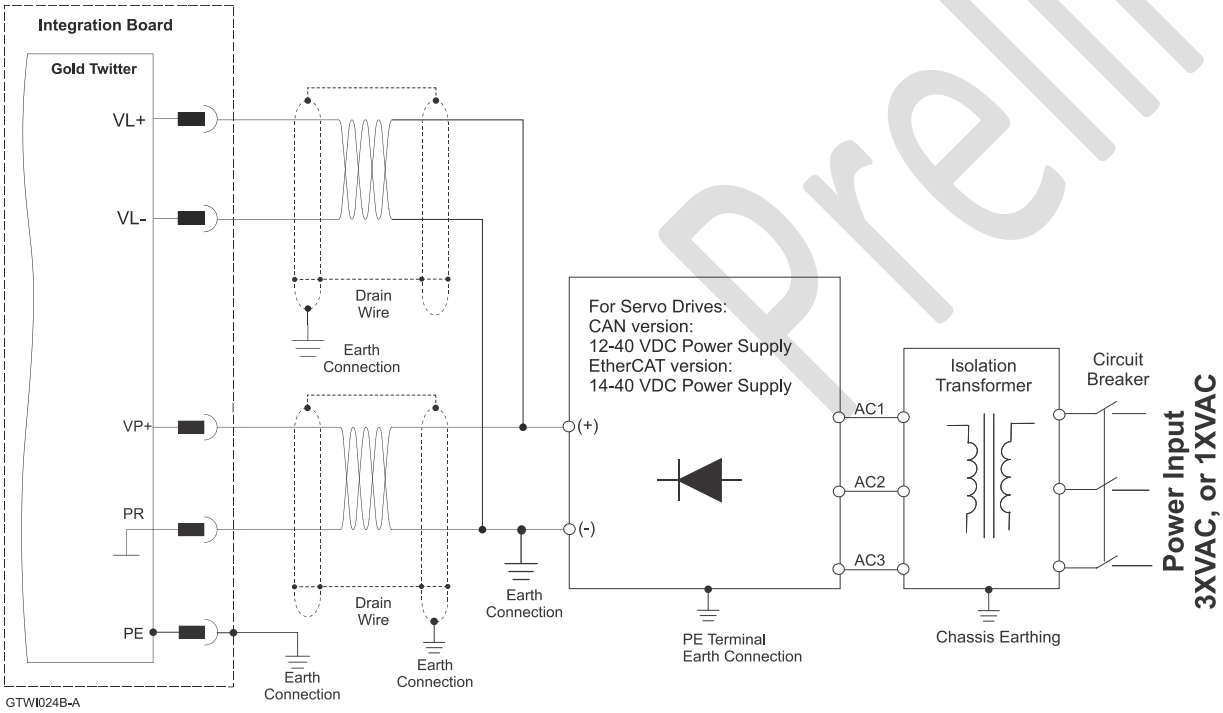
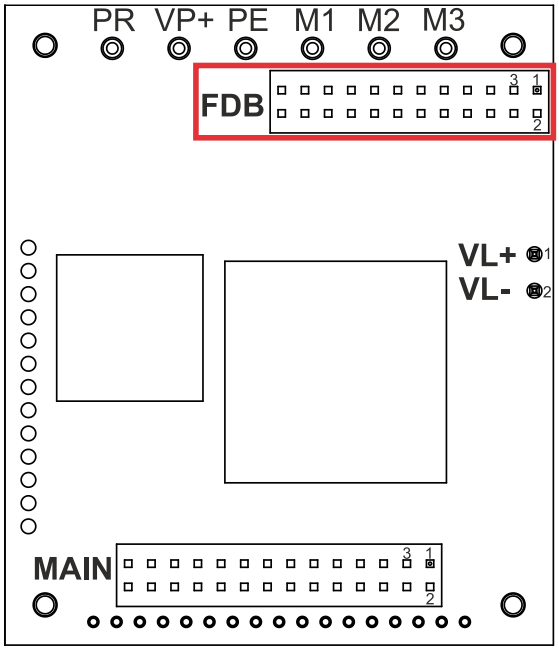
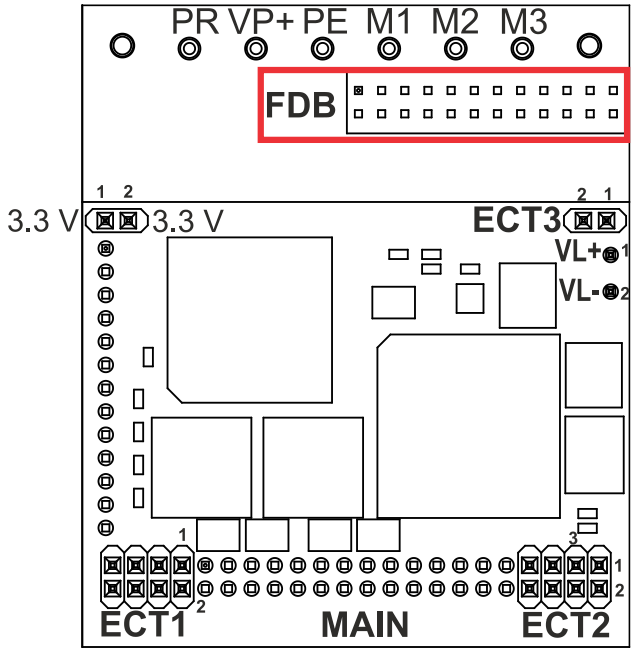


Figure 10: Single Power Supply (<40V) Connection Diagram With VL+ connected externally

8.2. Feedback Connector FDB



FDB Connector in the CAN option



FDB Connector in the EtherCAT option

Feedback A/B/C, Digital Halls – see Section 9.2 in the manual: MAN-G-Board Level Modules Hardware Manual.

Pin FDB	Signal	Function
1	PortA_ENC_A+ /ABS_CLK+	Port A- channel A/ Absolute encoder clock+
2	PortB_ENC_A-/SIN-	Port B - channel A complement
3	PortA_ENC_A-/ABS_CLK-	Port A- channel A complement / Absolute encoder clock-
4	PortB_ENC_A+/SIN+	Port B - channel A
5	PortA_ENC_B+/ABS_DATA+	Port A - channel B/ Absolute encoder Data+
6	PortB_ENC_B-/COS-	Port B - channel B complement
7	PortA_ENC_B-/ABS_DATA-	Port A - channel B complement / Absolute encoder Data-
8	PortB_ENC_B+/COS+	Port B - channel B
9	PortA_ENC_INDEX+	Port A – index
10	PortB_ENC_INDEX-/ANALOG_I-	Port B – index complement
	RESOLVER_OUT-	Vref complement
11	PortA_ENC_INDEX-	Port A - index complement

Pin FDB	Signal	Function
12	PortB_ENC_INDEX+/ANALOG_I+	Port B – index
	RESOLVER_OUT+	Vref
13	HA	Hall sensor A input
14	PortC_ENCO_A-	Port C- channel A complement output
15	HB	Hall sensor B input
16	PortC_ENCO_A+	Port C- channel A output
17	HC	Hall sensor C input
18	PortC_ENCO_B-	Port C - channel B complement output
19	+5VE	Encoder +5 V supply @ Limit 250 mA
20	PortC_ENCO_B+	Port C - channel B output
21	COMRET	Common return
22	PortC_ENCO_INDEX-	Port C - index complement output
23	COMRET	Common return
24	PortC_ENCO_INDEX+	Port C - index output

Table 6: Connector FDB – Feedback

8.2.1. Port A

Refer to section 10.3 in the MAN-G-Board Level Modules Hardware Manual for further details of the Port A connections.

8.2.1.1. Incremental Encoder

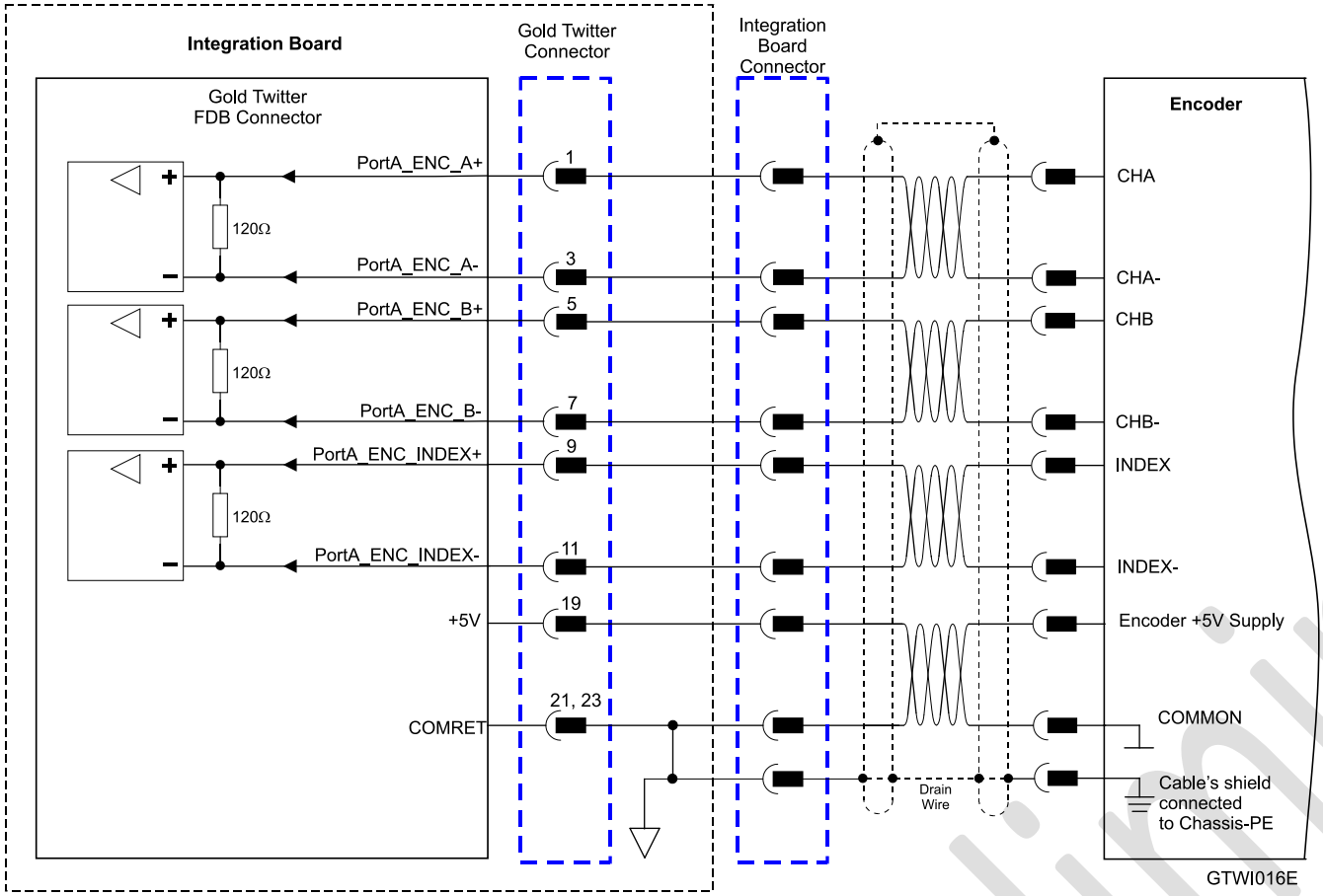


Figure 11: Port A Incremental Encoder Input – Recommended Connection Diagram

8.2.1.2. Absolute Serial Encoder

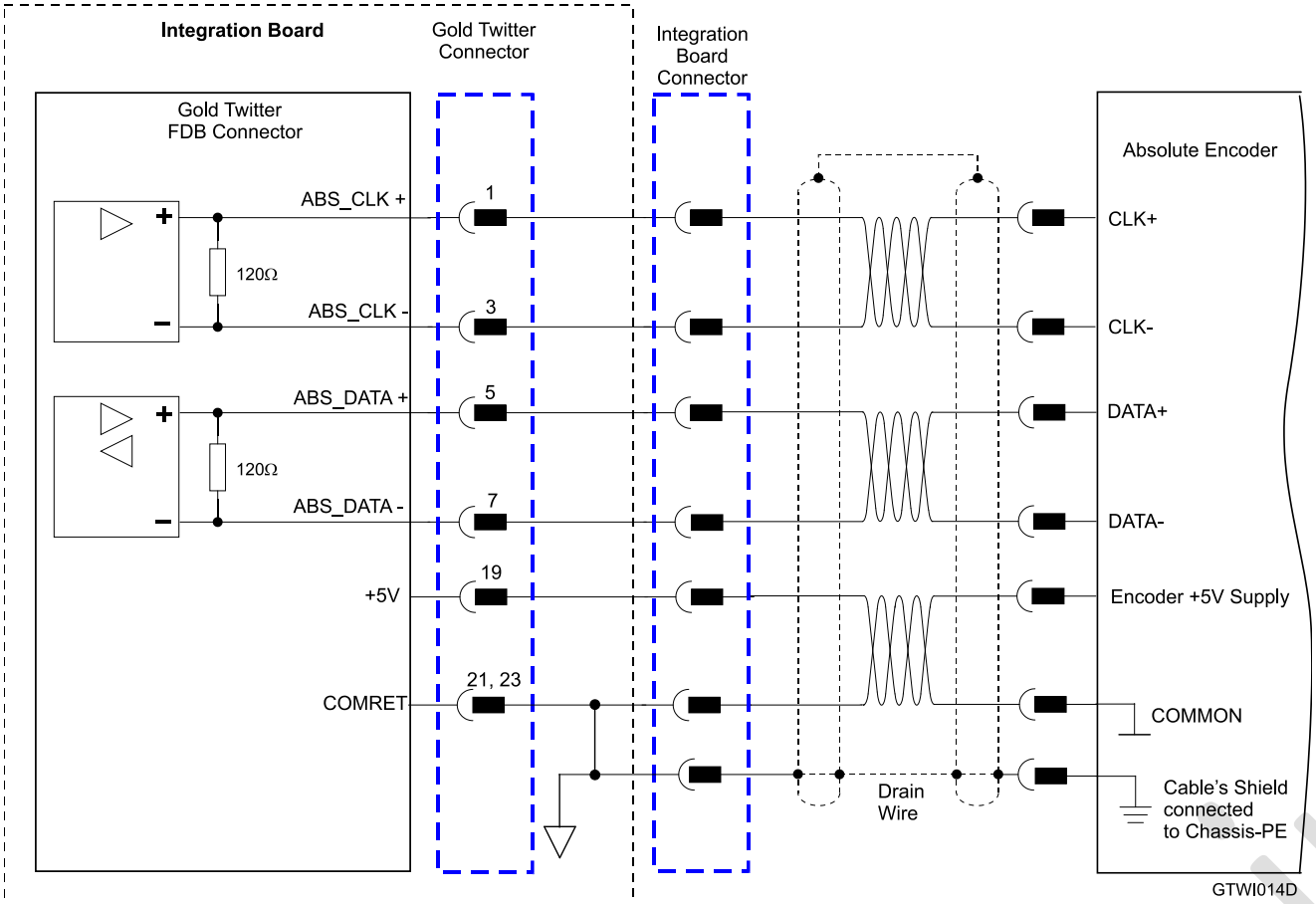


Figure 12: Absolute Serial Encoder – Recommended Connection Diagram for Sensors Supporting Data/Clock (e.g., Biss / SSI / EnDAT, etc.)

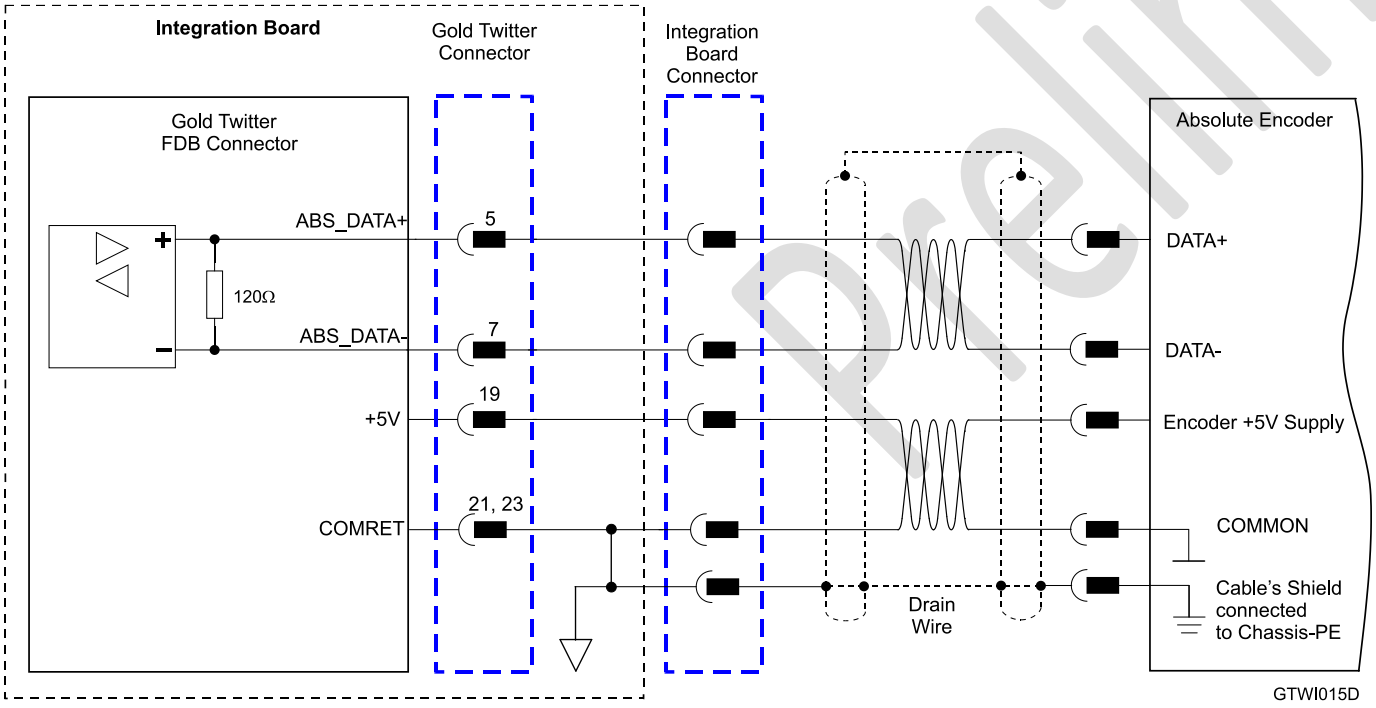


Figure 13: Absolute Serial Encoder – Recommended Connection Diagram for Sensors Supporting Data Line Only (NRZ types, e.g., Panasonic / Mitutoyo / etc.)

8.2.1.3. Hall Sensors

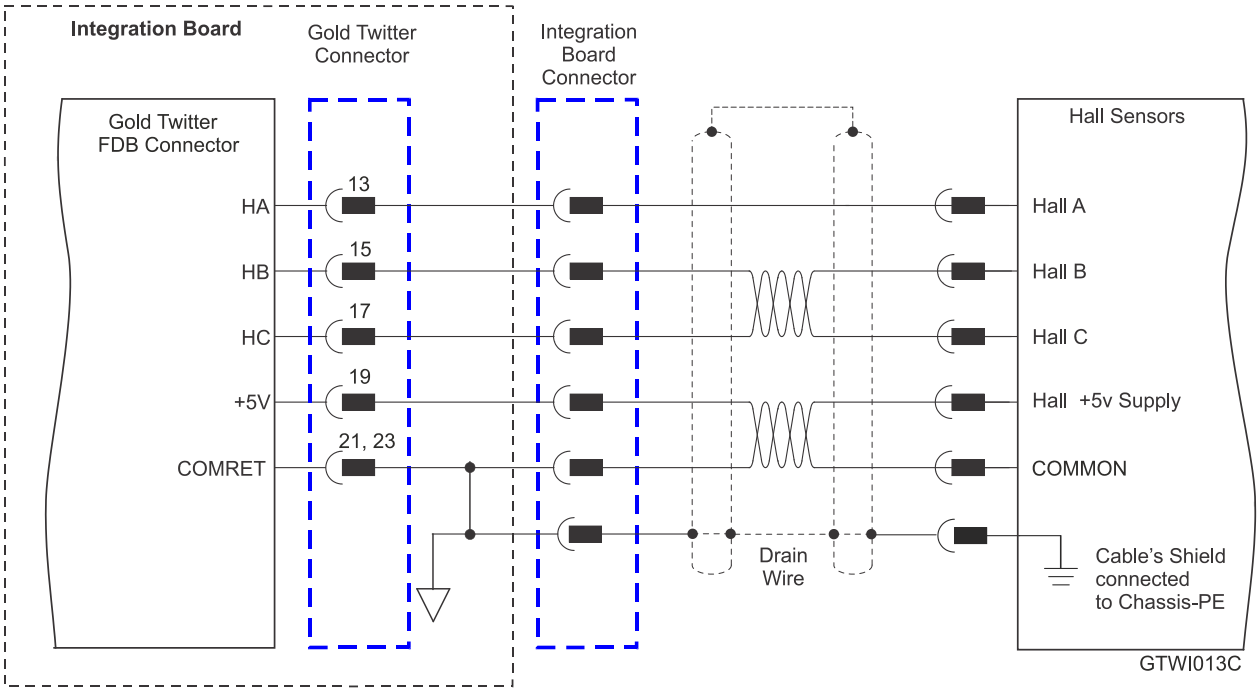


Figure 14: Hall Sensors Connection Diagram

8.2.2. Port B

Refer to section 10.4 in the MAN-G-Board Level Modules Hardware Manual for further details of the Port B connections.

8.2.2.1. Incremental Encoder

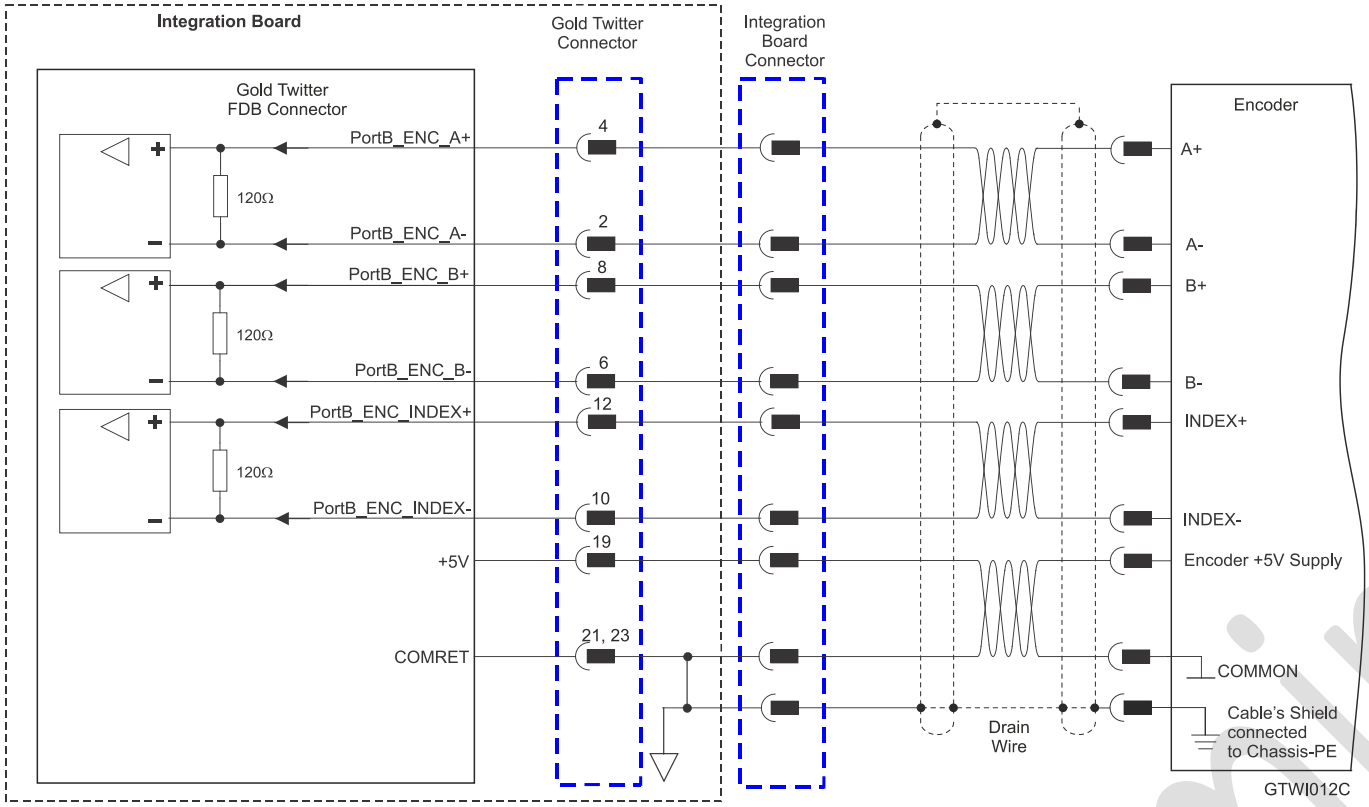


Figure 15: Port B Incremental Encoder Input – Recommended Connection Diagram

8.2.2.2. Interpolated Analog Encoder

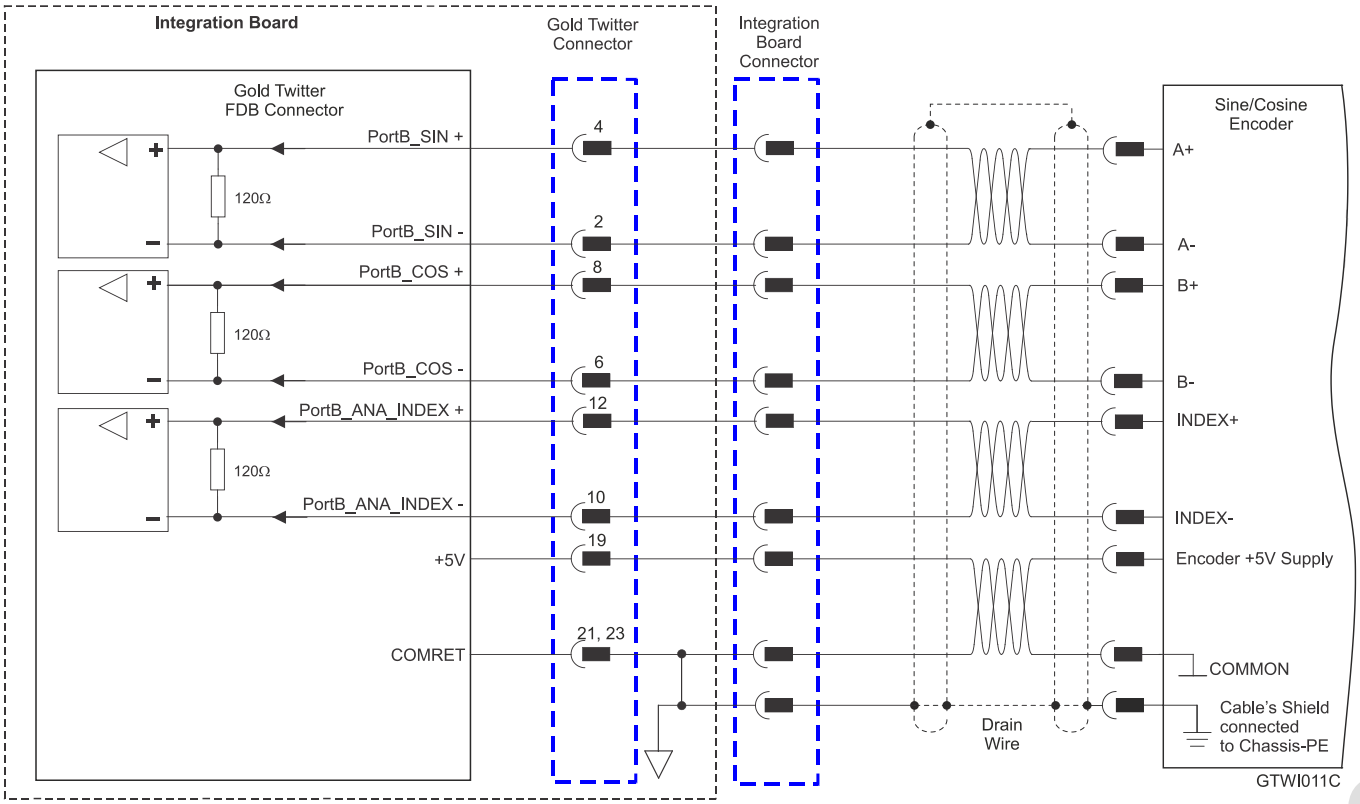


Figure 16: Port B - Interpolated Analog Encoder Connection Diagram

8.2.2.3. Resolver

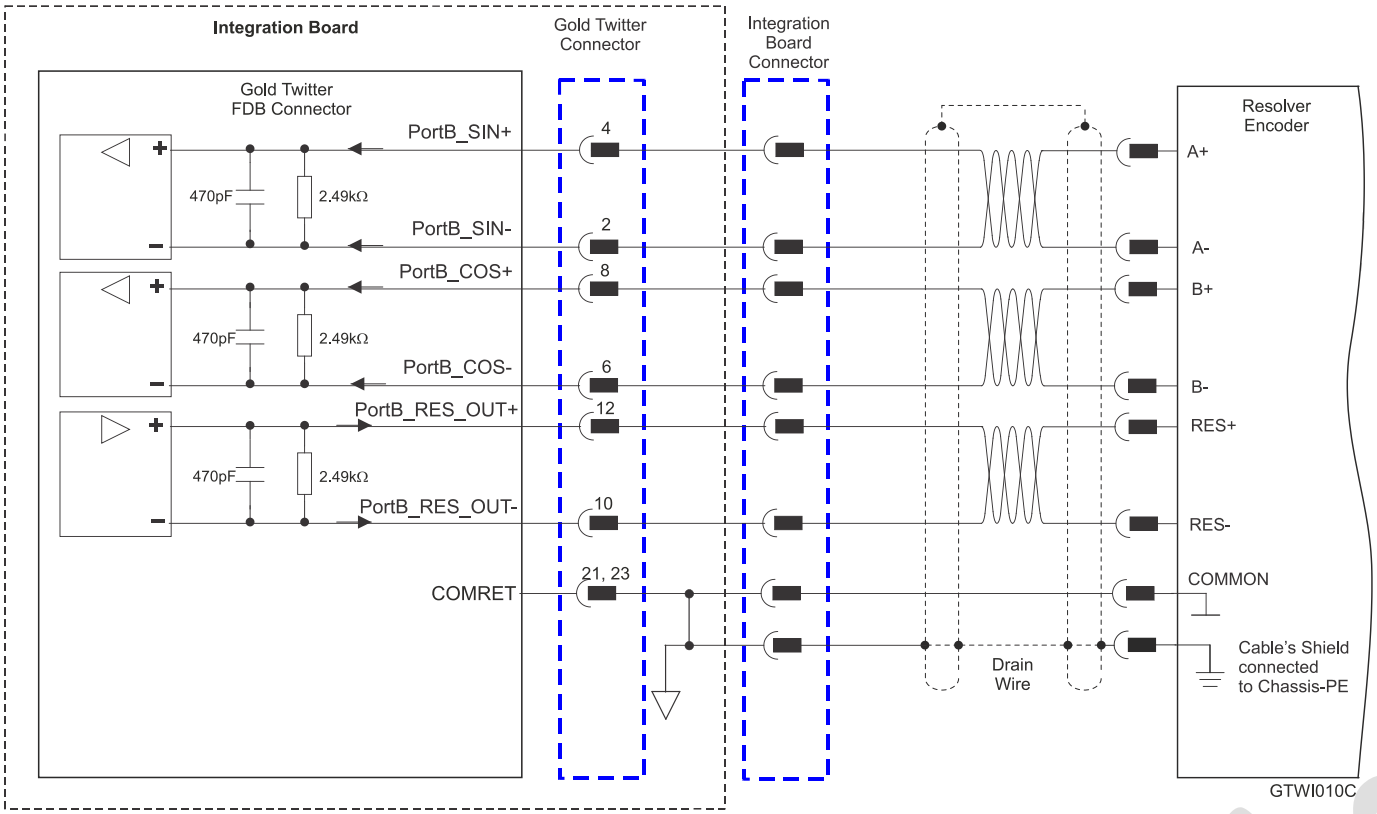


Figure 17: Port B – Resolver Connection Diagram

8.2.3. Port C – Emulated Encoder Output (FDB)

See Section 10.5 in the manual: MAN-G-Board Level Modules Hardware Manual for further details of Port C.

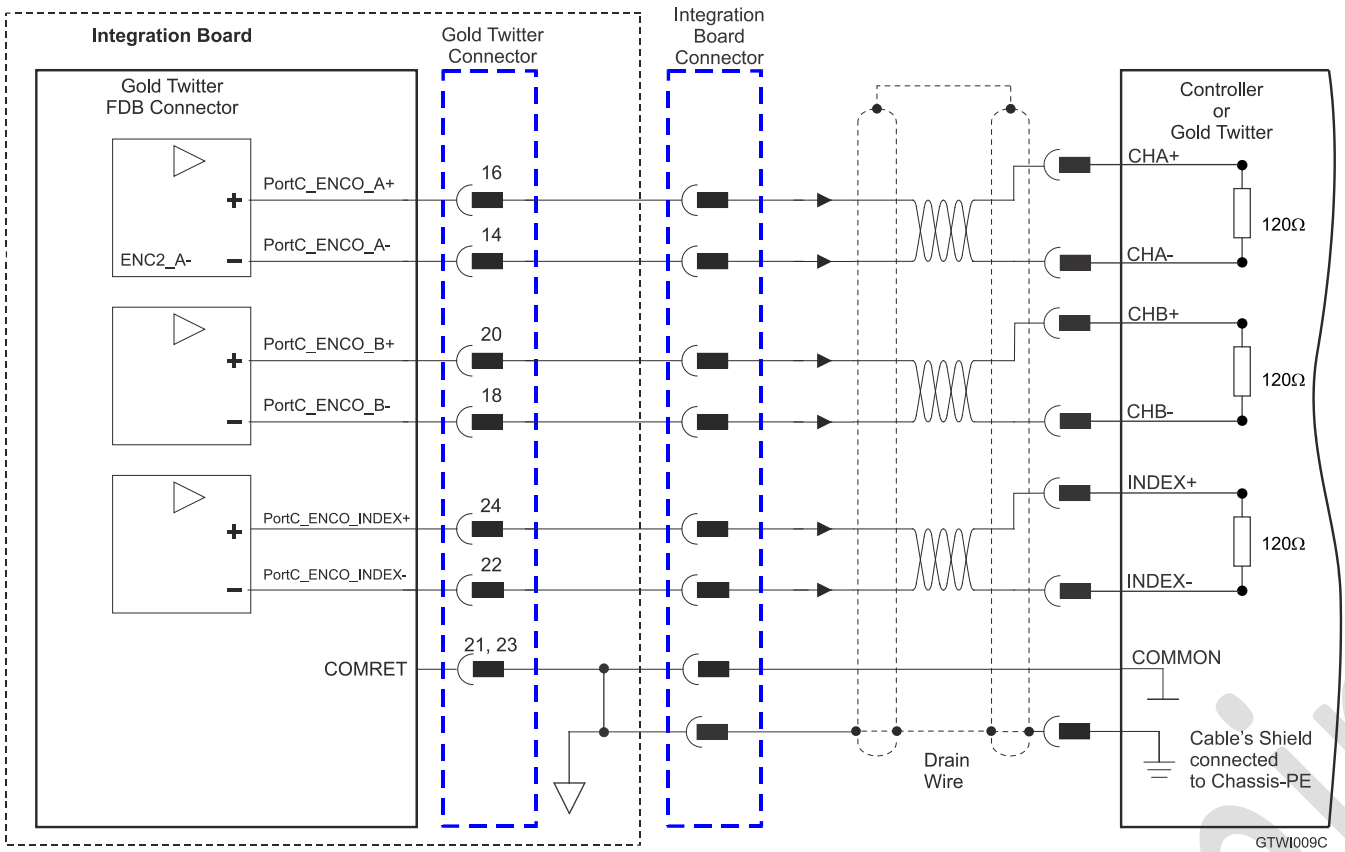
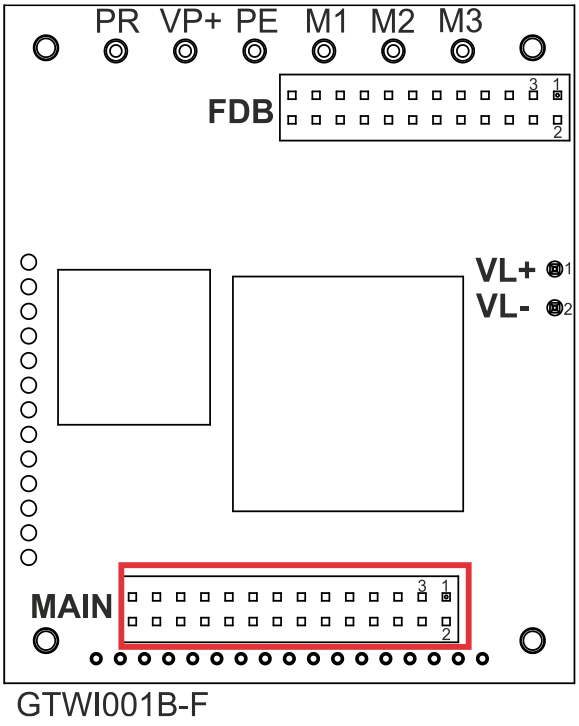
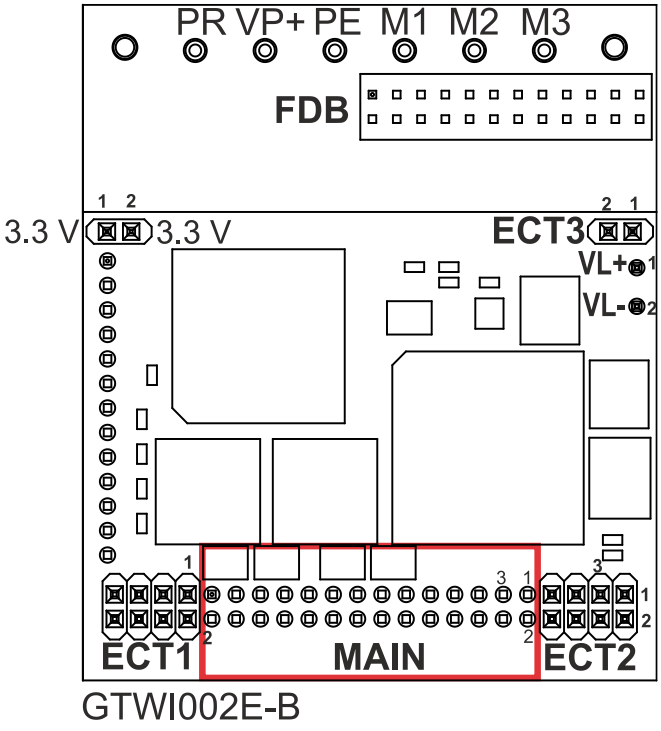


Figure 18: Emulated Encoder Differential Output – Recommended Connection Diagram

8.3. Main Connector (MAIN)



FDB Connector in the CAN option



FDB Connector in the EtherCAT option

Pin (MAIN)	Signal	Function
1	CAN Version: CANH	CAN Version: CAN_H BUS Line(dominant high)
	ECAT Version: LED_ET_ERR	ECT Version: EtherCAT status LED Error
2	CAN Version: CANL	CAN Version: CAN_L BUS Line(dominant low)
	ECAT Version: LED_ET_RUN	ECT Version: EtherCAT status LED Run
3	RS232_TX_S	Standard RS232 transmit
4	RS232_RX_S	Standard RS232 receive
5	RS232_TX /SB_IN	There are two options for this pin: **Option 1**: TTL RS232 transmit (Default) **Option 2**: Serial Bus IN for extended I/O (refer to MAN-G-Board Level Modules Hardware manual) This option is only available for EtherCAT

Pin (MAIN)	Signal	Function
6	RS232_RX /SB_OUT	There are two options for this pin: **Option 1**: TTL RS232 receive (default) **Option 2**: Serial Bus output for extended I/O (refer to MAN-G-Board Level Modules Hardware manual) This option is only available for EtherCAT
7	COMRET	Common return
8	COMRET	Common return
9	ANALOG1+	Analog input 1
10	ANALOG1-	Analog input 1 complement
11	ANALOG_IN2	Analog input 2
12	STO1	STO 1 input, opto isolated from control (COMRET)
13	STO_RET	STO signal return. The two digital STO inputs are optically isolated from the other parts of the drive, and share one return line.
14	STO2	STO 2 input
15	LED1	Bi-color indication output 1 (Cathode) Internal Resistor 1K Ω
16	LED2	Bi-color indication output 2 (Cathode) Internal Resistor 1K Ω
17	OUT4	Programmable output 4 (connected to COMRET) (**3.3V logic level**)
18	OUT2	Programmable output 2 (connected to COMRET) (**5V logic level**)
19	OUT3	Programmable output 3 (connected to COMRET) (**3.3V logic level**)
20	OUT1	Programmable output 1 (connected to COMRET) (**5V logic level**)
21	COMRET	Common return
22	COMRET	Common return
23	IN6	Programmable digital input 6 (connected to COMRET) (**5V logic level**)
24	IN5	Programmable digital input 5 (connected to COMRET) (**5V logic level**)

Pin (MAIN)	Signal	Function
25	IN4	Programmable digital input (connected to COMRET) (**5V logic level**)
26	IN3	Programmable digital input 3 (connected to COMRET) (**5V logic level**)
27	IN2	Programmable digital input 2 (connected to COMRET) (**5V logic level**)
28	IN1	Programmable digital input 1 (connected to COMRET) (**5V logic level**)

Table 7: Connector MAIN – I/O, STO, Analog, LEDs

LEDs

For full details on the LEDs, see Chapter 7, and section 12.2.1 in the in the MAN-G-Board Level Modules Hardware manual for full details.

STO (safety)

For full details on STO, see Chapter 9 in the in the MAN-G-Board Level Modules Hardware manual for full details.

8.3.1. Digital Inputs

The following table describes the electrical specification of the inputs IN1 and IN6:

Feature	Details
Input Voltage (VIN)	0 to 6V
V_{ih} min	2.2V
V_{il} max	0.6V
R_1 Pull-up Resistor	If VT = 3.3V, R1<3.3KΩ If VT = 5V, R1<10KΩ
Minimum pulse width	> 250 µsec
Execution time (all inputs): the time from application of voltage on input until execution is complete	0 < T < 250 µsec
High-speed inputs – 1–6 minimum pulse width, in high-speed mode	T = 5 µsec if the input functionality is set to latch/capture (index/strobe). **Note: Home mode is high-speed mode and can be used for fast capture and precise homing.**
Capture with differential input Port A, Port B Index	T > 0.1 µsec if the differential input functionality is set to touch probe/capture (index/strobe).

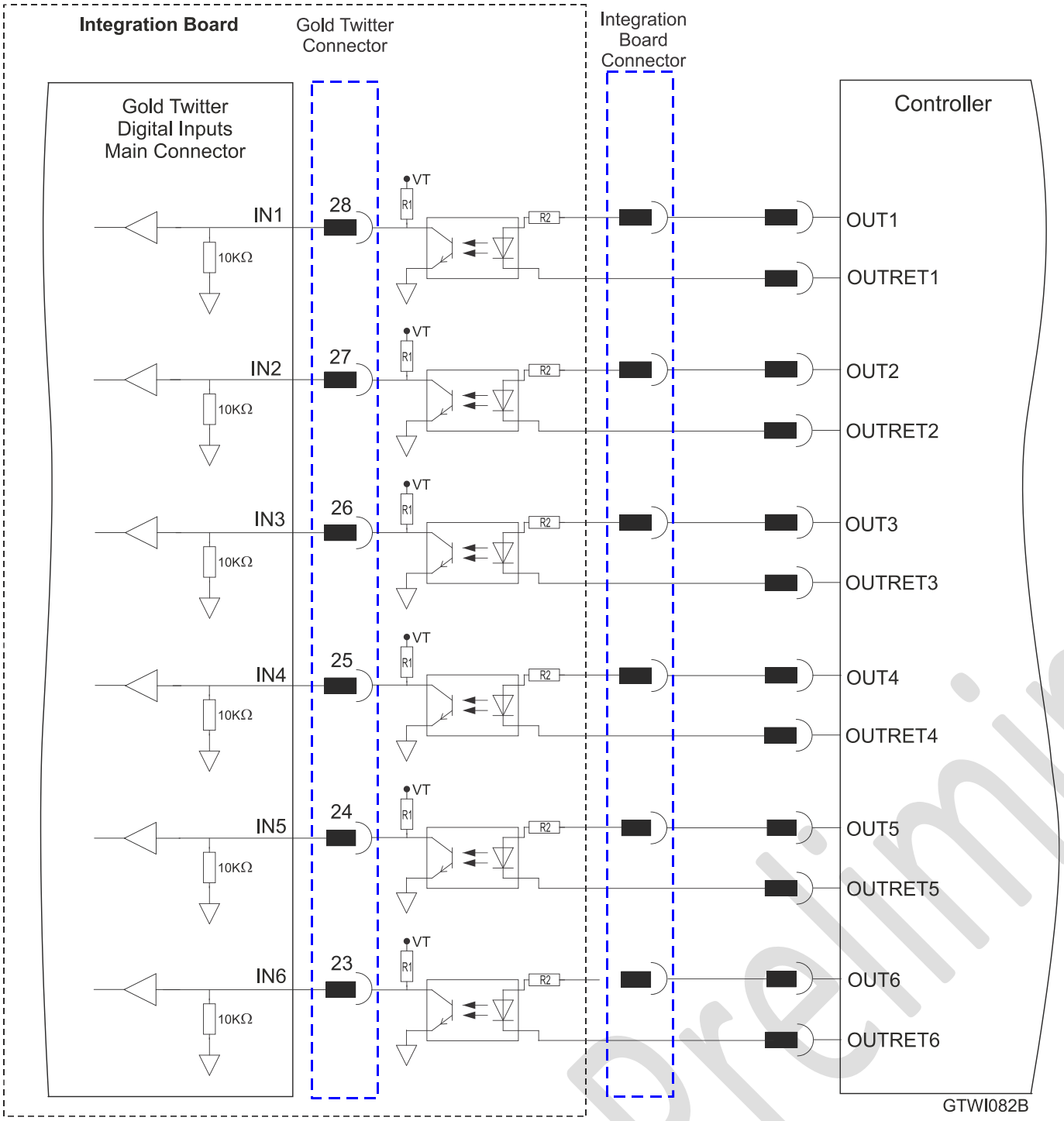


Figure 19: Digital Input 5V Logic level Mode Connection Diagram

8.3.2. Digital Outputs

There are two types of Digital outputs:

- Out1 and Out2 5V Logic
- Out3 and Out4 3.3V Logic

The following table describes the electrical specification of the outputs OUT1 and OUT2:

Feature	Details
Type of output	5V Logic
VOL max (low level)	V_{out} (Low) ≤ 0.52V at 10 mA
VOH min (High level)	V_{out} (High) >4.9V at 10 mA
Max. output current I_{outH} (max)	10 mA
Ton (time from low to high)	<1µsec
Toff (time from high to low)	<1µsec
Executable time	0 < T < 250 µsec

The following table describes the electrical specification of the outputs OUT3 and OUT4.

Feature	Details
Type of output	3.3V Logic
VOL max (low level)	V_{out} (On) ≤ 0.4V at 8 mA
VOH min (High level)	V_{out} (High) >2.5V at 8 mA
Max. output current I_{outH} (max)	8 mA
Ton (time from low to high)	<1usec
Toff (time from high to low)	<1usec
Executable time	0 < T < 250 µsec

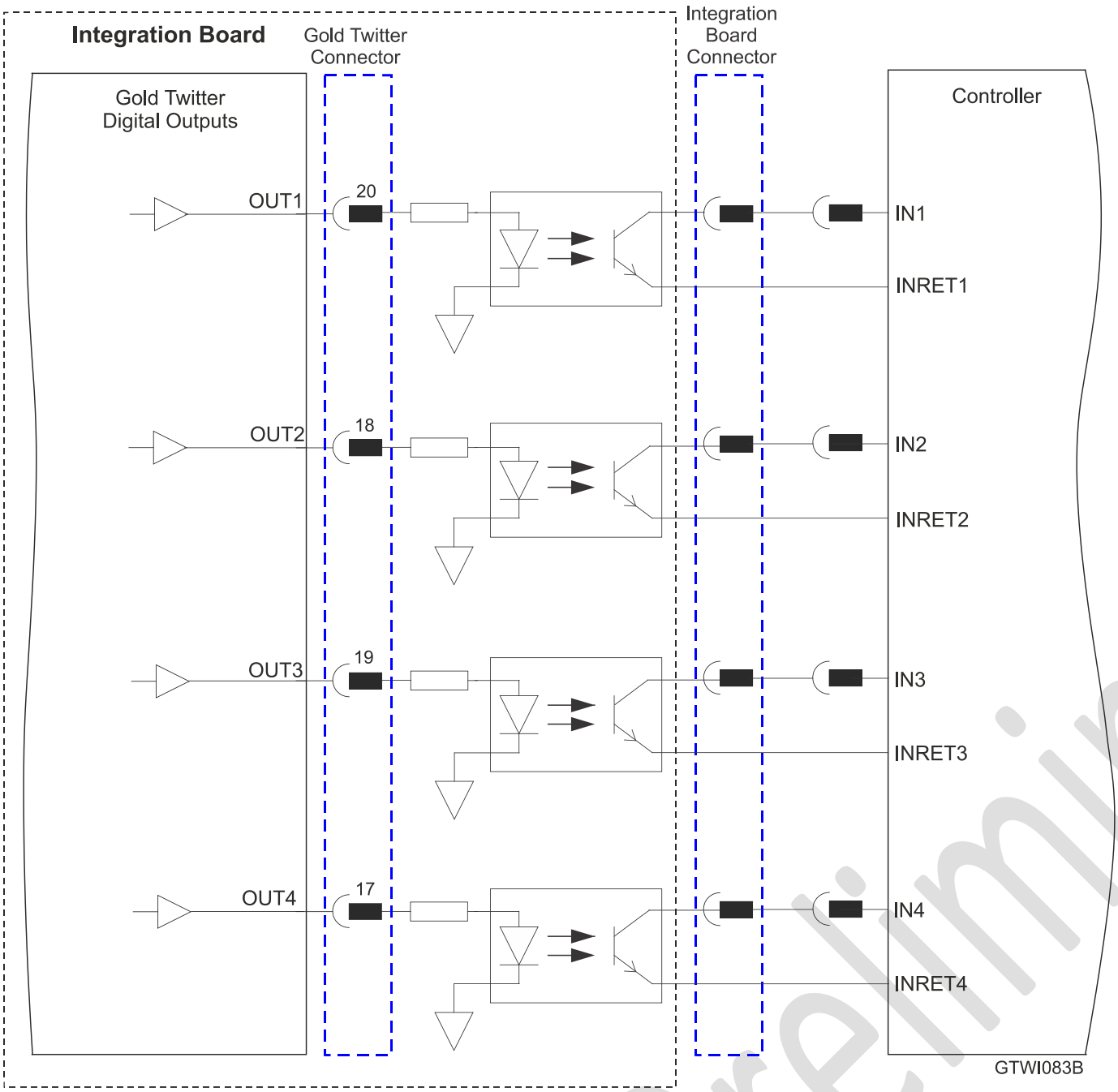


Figure 20: Digital Output 5V and 3.3V Level Mode Connection Diagram

8.3.3. STO (Safe Torque Off)

For full details on STO, see Chapter 9 in the MAN-G-Board Level Modules Hardware manual.

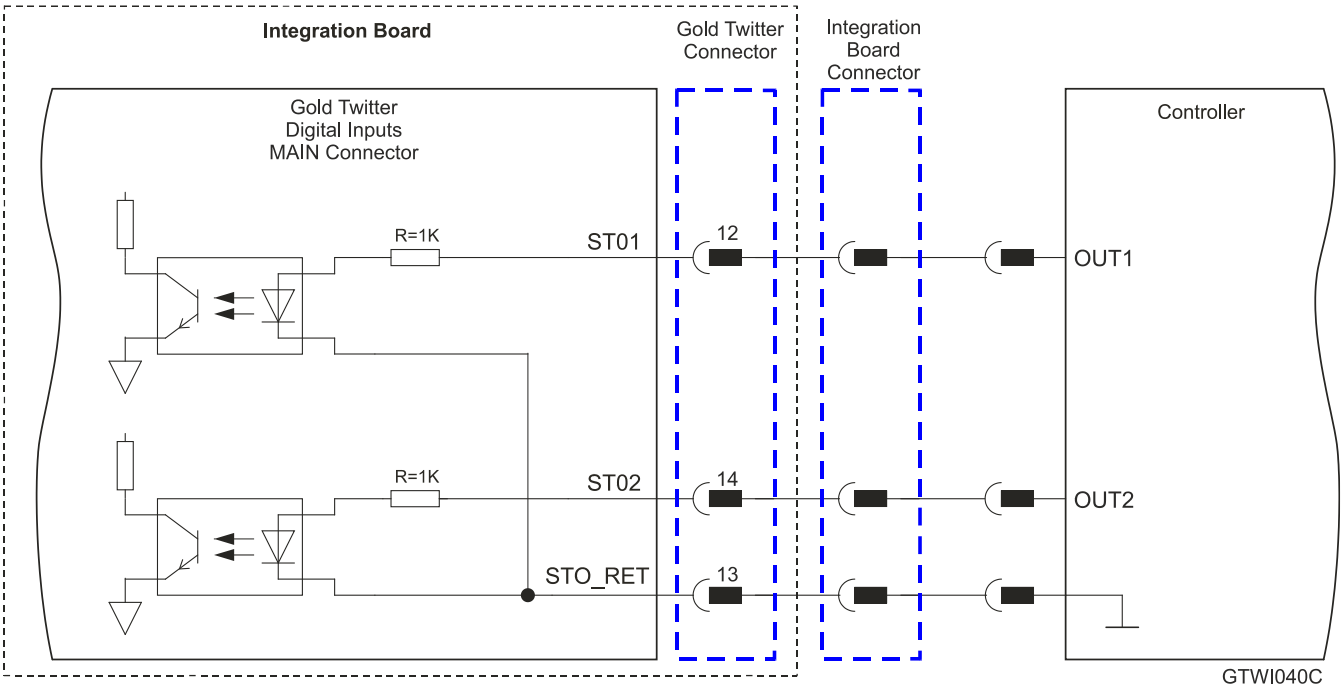


Figure 21: STO Input Connection – 5V Logic Level

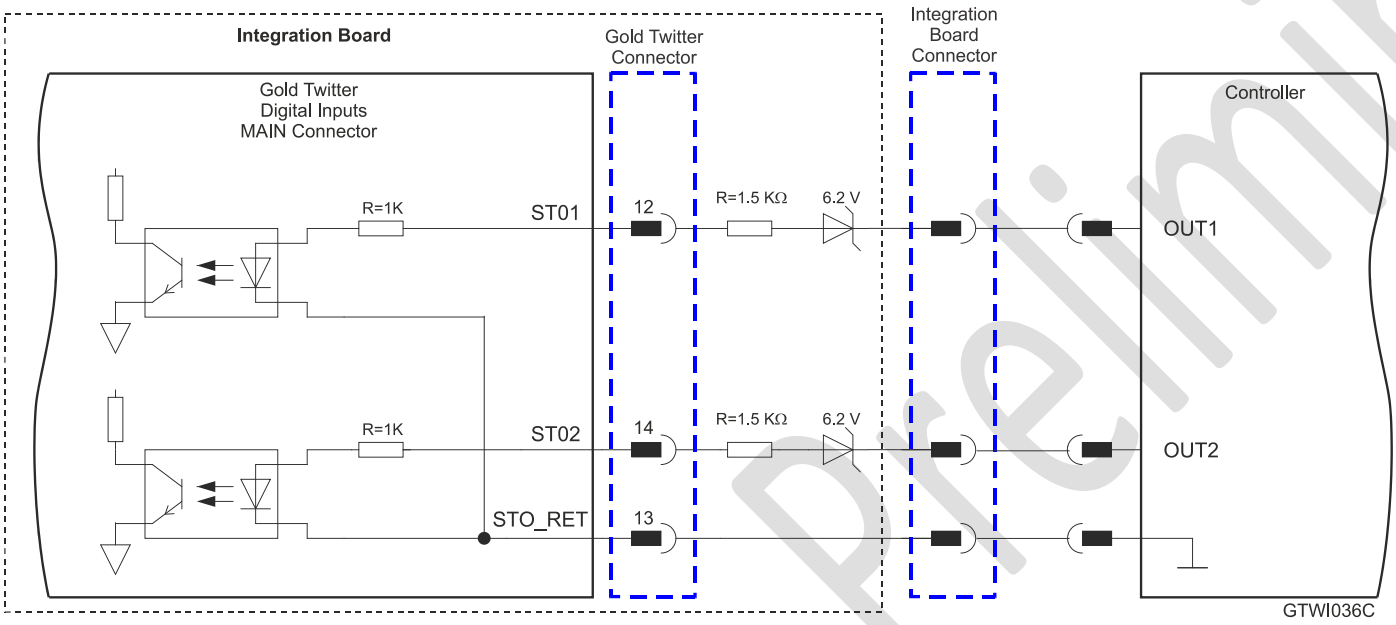


Figure 22: STO Input Connection – PLC (24V Logic)

8.3.4. Analog Input

For full details on Analog Inputs, see section 11.3 in the MAN-G-Board Level Modules Hardware manual.

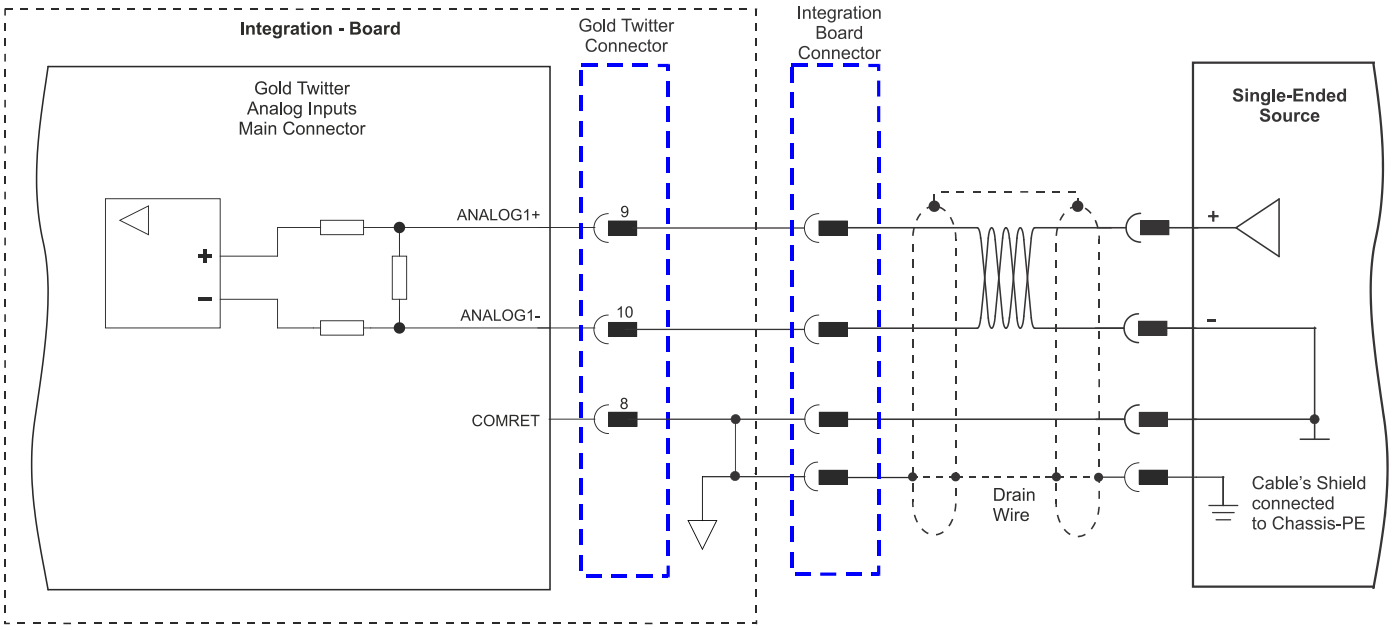


Figure 23: Analog Input

8.3.5. CAN Option

For full details on CANopen communication, see section 12.4 in the MAN-G-Board Level Modules Hardware manual.

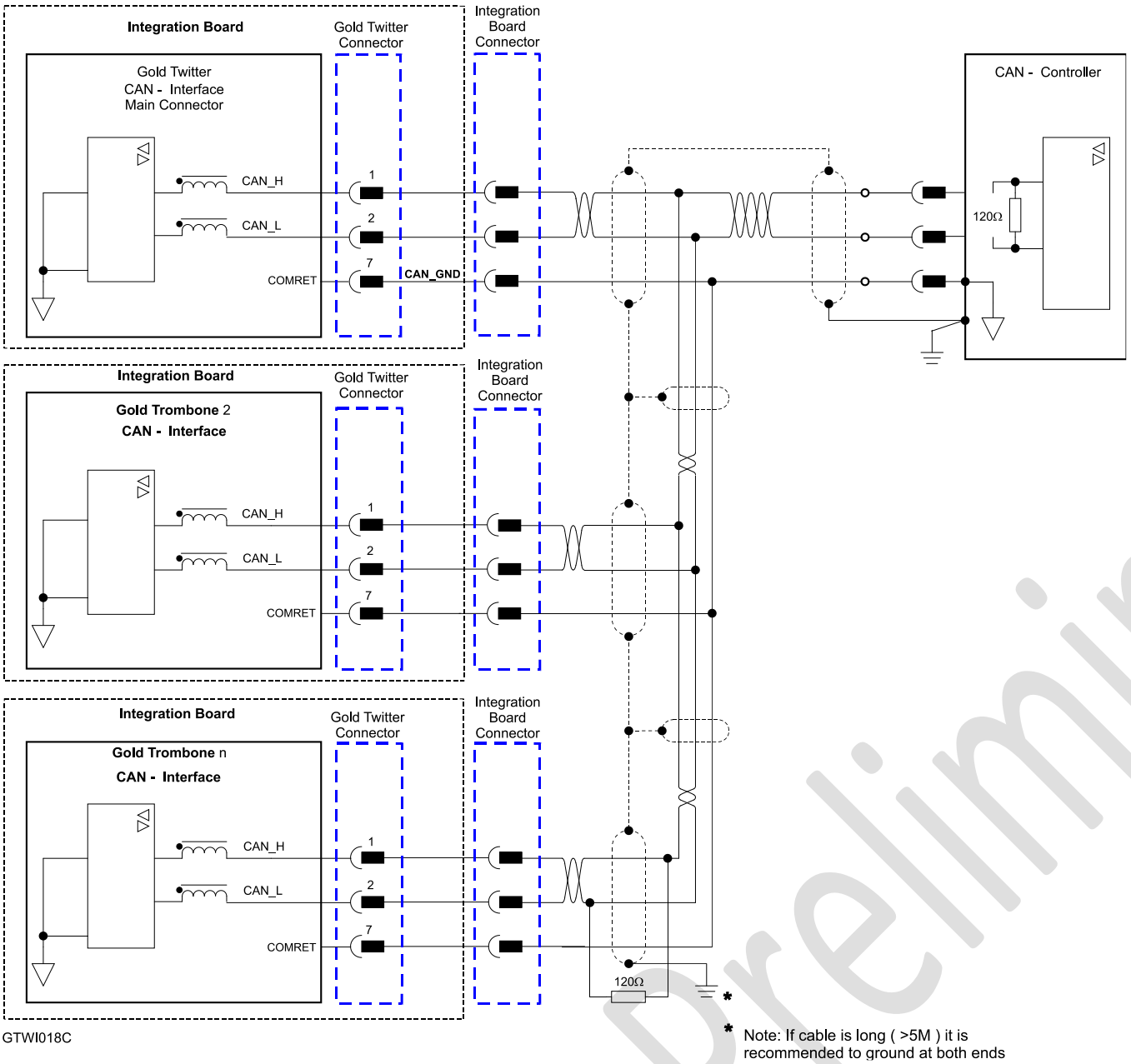


Figure 24: CAN Network Diagram

Caution: When installing CAN communication, ensure that each servo drive is allocated a unique ID. Otherwise, the CAN network may “hang”.

8.3.6. RS232

There are two types of RS232: Standard RS232 and RS232 TTL Level.

Figure 25 describes the Standard RS232 connection diagram.

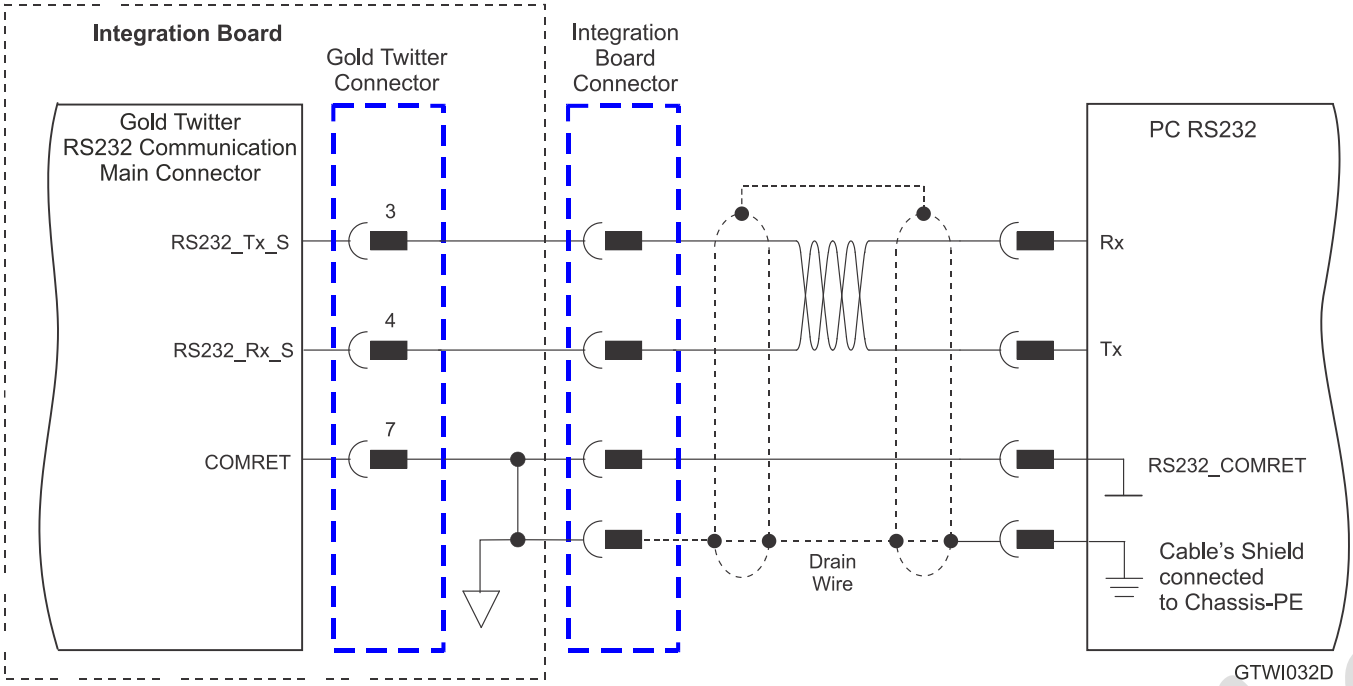


Figure 25: RS232 Connection Diagram

For full details on RS232 TTL Level communication, see section 12.5.1 in the MAN-G-Board Level Modules Hardware manual.

The RS232 TTL Level will be used in order to connect Differential RS232 (RS422).

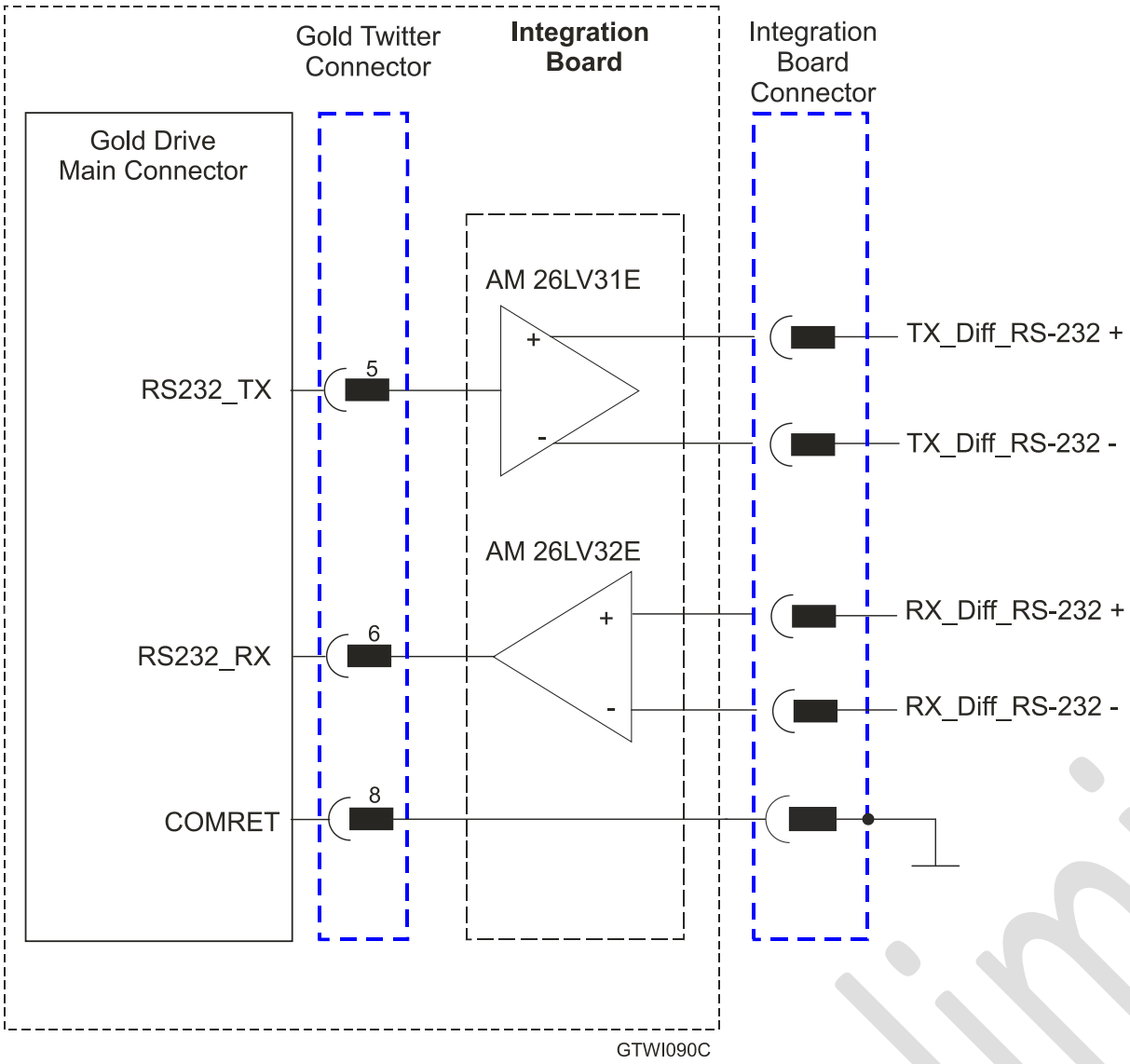
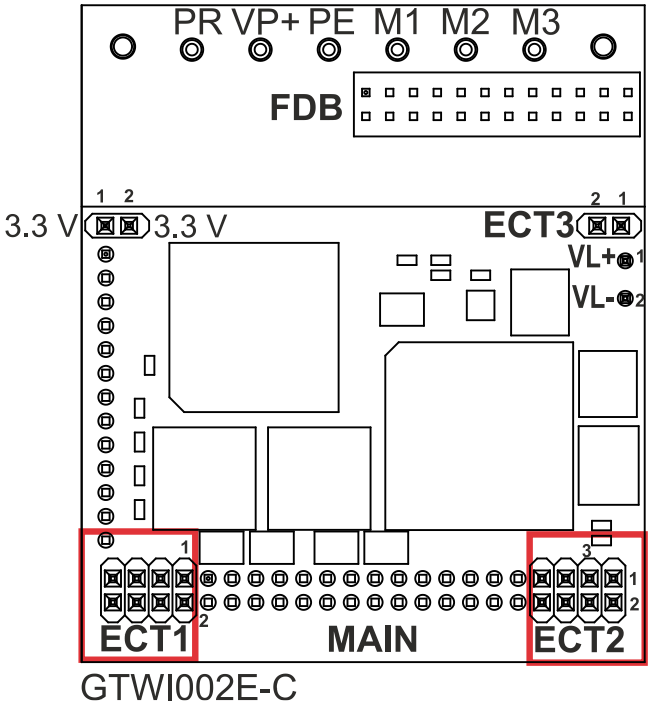


Figure 26: Differential RS232 (RS422) Connection Diagram

8.4. EtherCAT Module



For full details on EtherCAT communication, see Section 12.2 in the in the MAN-G-Board Level Modules Hardware manual.

8.4.1. EtherCAT Module Connectors

8.4.1.1. ECT2 connector

Pin (ECT2)	Signal	Function
1	USB_VBUS	USB VBUS 5V Detector
2	USBD+	USB_P line
3	COMRET	USB communication return
4	USBD-	USB_N line
5	PHY_IN_LINK_ACT	Indicates EtherCAT IN/Ethernet LINK input
6	PHY_OUT_LINK_ACT	Indicates EtherCAT OUT LINK
7	PHY_IN_SPEED	Indicates EtherCAT IN/Ethernet Speed input
8	PHY_OUT_SPEED	Indicates EtherCAT OUT Speed

Table 8: Connector ECT2

8.4.1.2. ECT1 connector

Pin (ECT1)	Signal	Function
1	PHY_OUT_RX+	EtherCAT OUT RX+ Line
2	PHY_OUT_TX+	EtherCAT OUT RX- Line
3	PHY_OUT_RX-	EtherCAT OUT TX+ Line
4	PHY_OUT_TX-	EtherCAT OUT TX- Line
5	PHY_IN_RX+	EtherCAT IN/Ethernet RX+ Line
6	PHY_IN_TX+	EtherCAT IN/Ethernet RX- Line
7	PHY_IN_RX-	EtherCAT IN/ethernet TX+ Line
8	PHY_IN_TX-	EtherCAT IN/Ethernet TX- Line

Table 9: Connector ECT1

Note: **EtherCAT IN port can be configured to an Ethernet Port.**

8.4.1.3. ECT3 Connector

Pin (ECT3)	Signal	Function
1	SB_Load	Serial Bus Load for extended IO (refer to the MAN-G-Panel Mounted Drives Hardware Manual)
2	SB_Clock	Serial Bus_Clock (9.375Mhz) for extended IO (refer to the MAN-G-Panel Mounted Drives Hardware Manual)

Table 10: Connector ECT3

8.4.1.4. 3.3V Connector

Pin	Signal	Function
1	3.3V	3.3 V supply voltage for EtherCAT LEDs
2	3.3V	3.3 V supply voltage for EtherCAT LEDs

Table 11: 3.3V Connector

8.4.2. EtherCAT Communication

This section only describes the EtherCAT communication, and the pinout drawing of the connector.

When the EtherCAT is connected and the FoE is in operation, the USB cable connection must be disconnected.

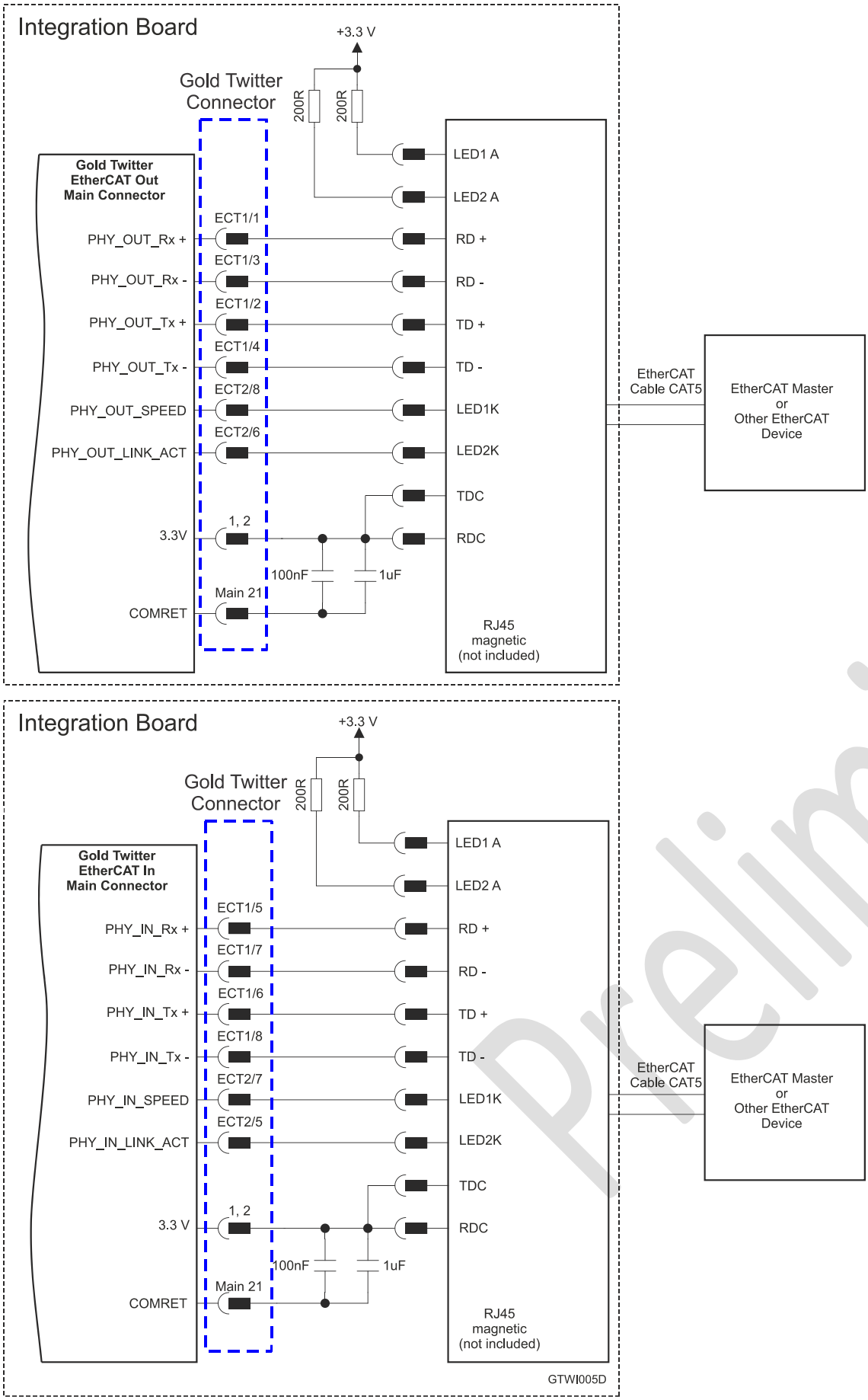


Figure 27: EtherCAT Connection Schematic Diagram

8.4.3. USB 2.0 Communication

For full details on USB communication, see section 12.1 in the MAN-G-Board Level Modules Hardware manual.

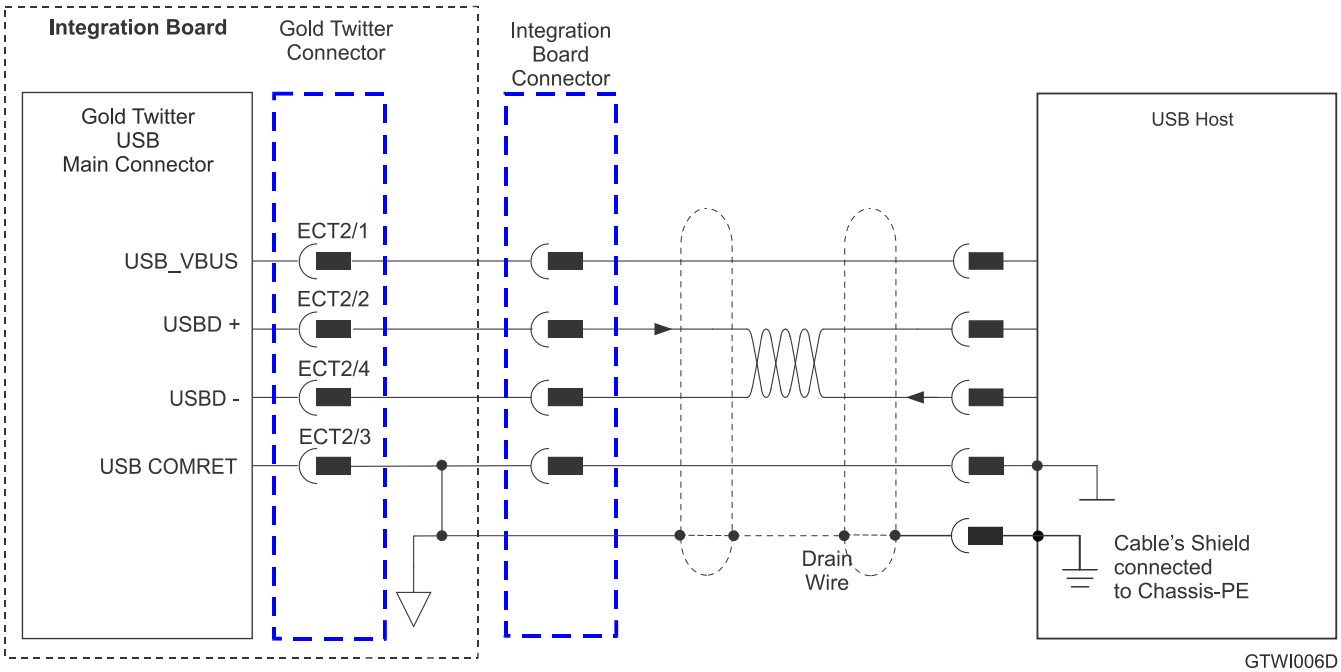


Figure 28: USB Network Diagram

Chapter 9: Powering Up

After the Gold Twitter is connected to its device, it is ready to be powered up.

Caution:
Before applying power, ensure that the DC supply is within the specified range and that the proper plus-minus connections are in order.

9.1. Initializing the System

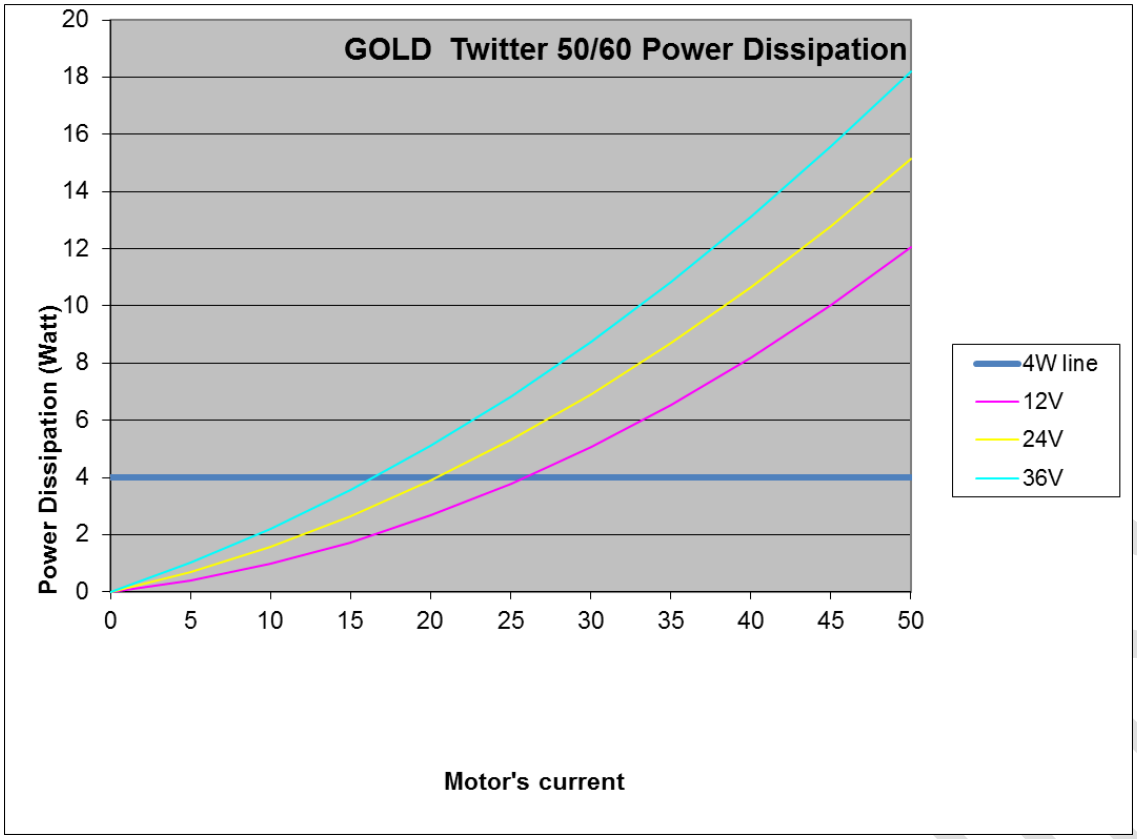
After the Gold Twitter has been connected and mounted, the system must be set up and initialized. This is accomplished using the *EASII*, Elmo's Windows-based software application. Install the application and then perform setup and initialization according to the directions in the *EASII User Manual*.

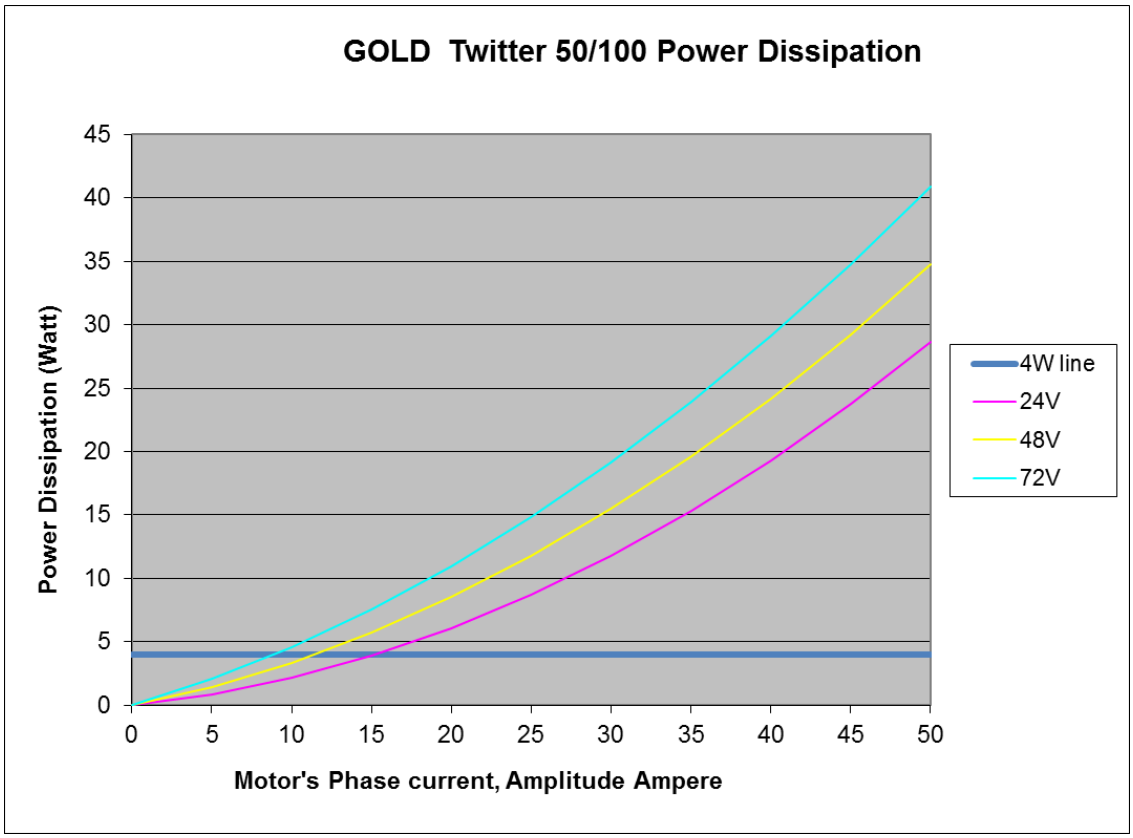
9.2. Heat Dissipation

The best way to dissipate heat from the Gold Twitter is to mount it so that its heat-sink faces up. For best results leave approximately 10 mm of space between the Gold Twitter's heat-sink and any other assembly.

9.2.1. Heat Dissipation Data

Heat Dissipation is shown in graphically below:





9.2.2. How to Use the Chart

The charts above are based upon theoretical worst-case conditions. Actual test results show 30% to 50% better power dissipation.

To determine if your application needs a heat-sink:

1. Allow maximum heat-sink temperature to be 80 °C or less.
2. Determine the ambient operating temperature of the Gold Twitter.
3. Calculate the allowable temperature increase as follows:
   for an ambient temperature of 40 °C , ΔT= 80 °C – 40 °C = 40 °C
4. Use the chart to find the actual dissipation power of the drive. Follow the voltage curve to the desired output current and then find the dissipated power.
   If the dissipated power is below 4 W the Gold Twitter will need no additional cooling.

Note:

The chart above shows that no heat-sink is required when the heat-sink temperature is 80 °C, ambient temperature is 40 °C and heat dissipated is 4 W.

Chapter 10: Dimensions

This chapter provides detailed technical dimensions regarding the Gold Twitter.

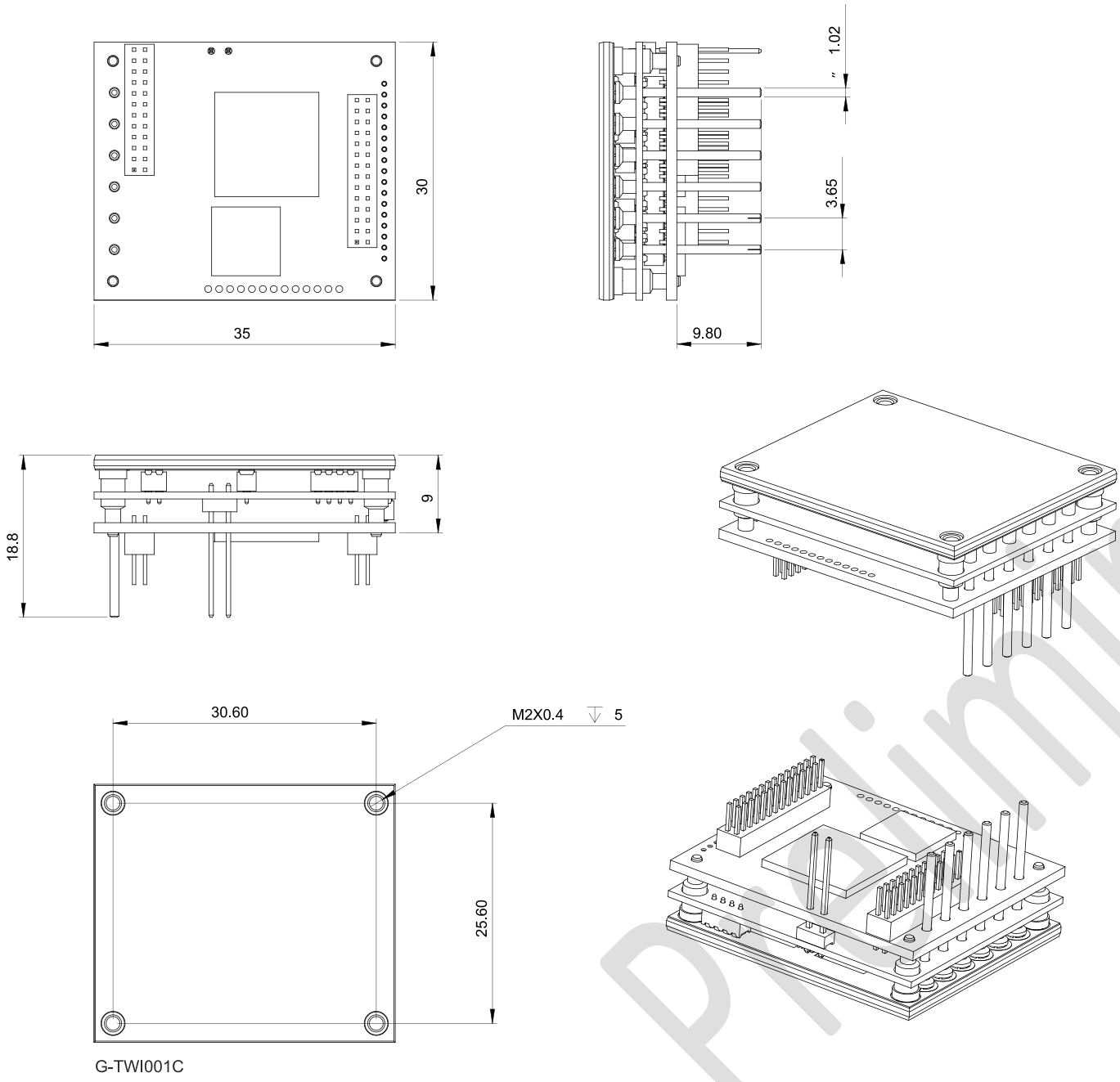


Figure 29: G-Twitter CAN Version

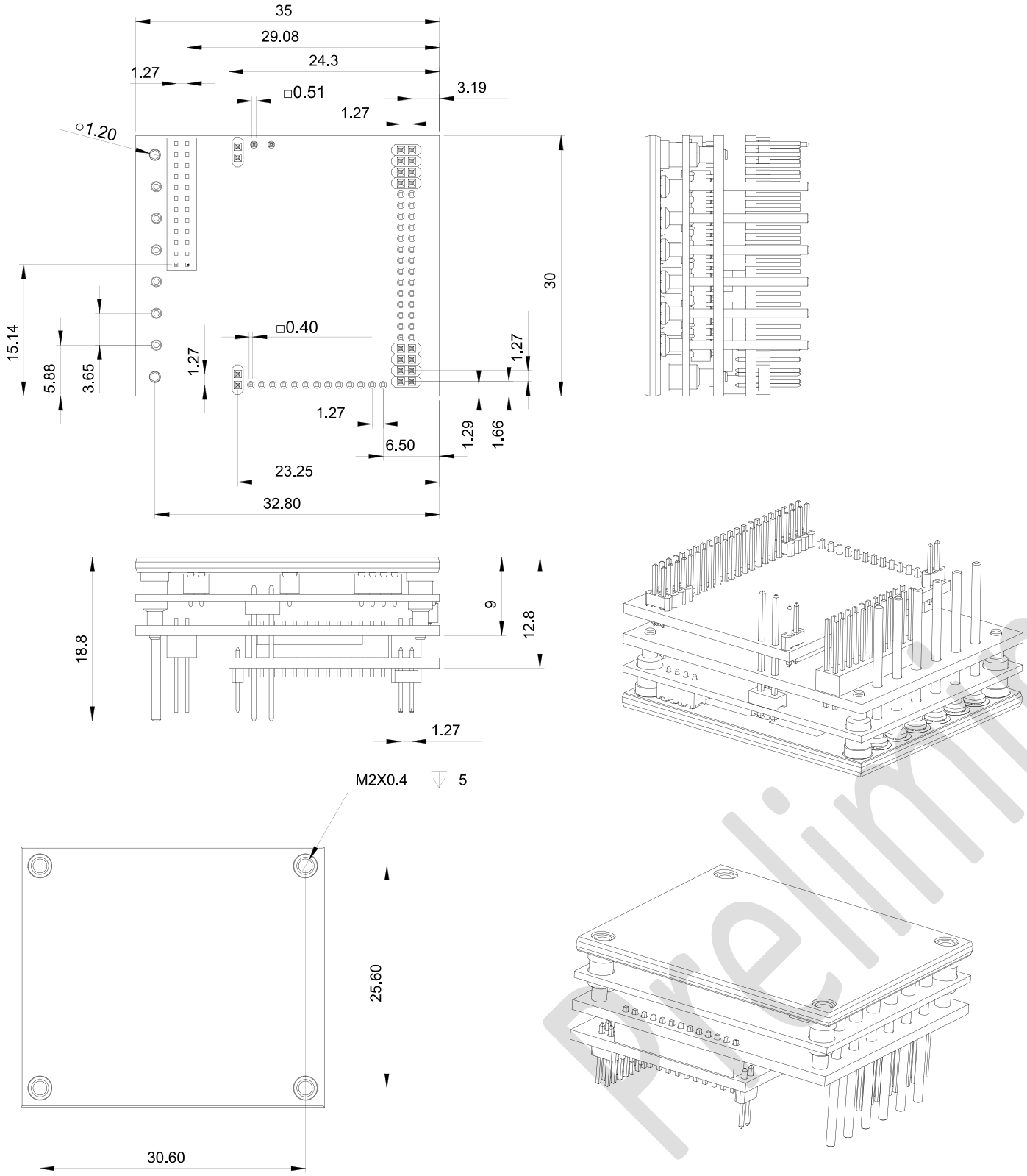


Figure 30: G-Twitter EtherCAT version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Motion Control